EPSON

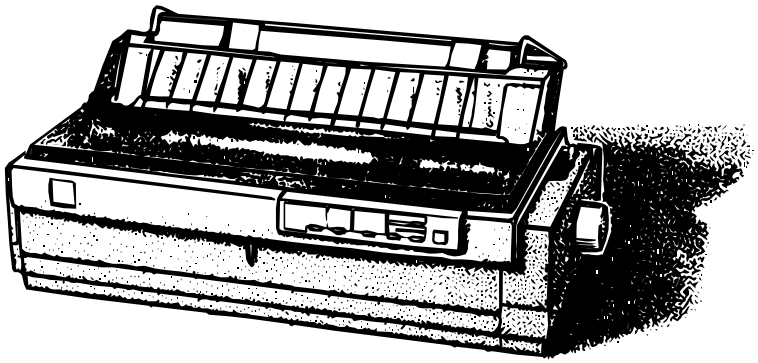
EPSON France S.A.

FX-2180

PRODUIT

SERVICE MANUAL

SERVICE MANUAL



9 Pin Impact Dot Printer

EPSON FX-2180

COLOR IMAGING EPSON

EPSON®

4009047

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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1)Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NOWORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIER WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

PREFACE

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of FX-2180. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3. TROUBLESHOOTING

Provides the step-by-step procedures for troubleshooting.

CHAPTER 4. DISASSEMBLY AND ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5. ADJUSTMENTS

Provides Epson-approved methods for adjustment.

CHAPTER 6. MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIX

Provides the following additional information for reference:

- *Connector pin assignments*
- *Electric circuit boards components layout*
- *Exploded diagram*
- *Electrical circuit boards schematics*

REVISION STATUS

Rev.	Date	Page(s)	Contents
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CHAPTER

1

PRODUCT DESCRIPTIONS

1.1 SPECIFICATIONS

This printer is based on FX-2170. The printing speed and copy ability and etc., are increased than that. So, almost main components of this printer is similar to that.
This section describes the specifications of this printer as followings;

PRINTING SPECIFICATION

Print method	Impact dot matrix
Number of pin	18 pins
Print pin arrangement	9 × 2
Print pin diameter	0.0114 inch (0.29mm)
Color	Monochrome
Print direction	Bi-direction with logical seeking

PRINT SPEED & PRINTABLE COLUMN

Table 1-1. Print Speed & Column

Printing mode	Character pitch	Printable column	Printing speed (cps)		
			Normal	Copy 1	Copy 2
High speed draft	10 cpi	136	506	439	337
Draft	10 cpi	136	380	330	284
	12 cpi	163	455	396	341
	15 cpi	204	380	285	285
Draft condensed	17 cpi	233	325	282	244
	20 cpi	272	380	330	284
Draft emphasized	10 cpi	136	190	165	142
NLQ	10 cpi	136	95	82	71
	12 cpi	163	114	99	85
	15 cpi	204	94	71	31

- *When the power supply voltage drops to the lower limit, the printer stops printing and then starts printing remain on that line again more slowly than before.*
- *When the head temperature rises to the upper limit, the printer stops printing. When the head temperature falls to the normal level, the printer starts printing again more slowly than before.*
- *Copy 1 : when paper thickness level is set 3.*
- *Copy 2 : When paper thickness lever is set 4 or more.*

RESOLUTION

Table 1-2. Resolution

Printing mode	Horizontal density	Vertical density	Adjacent dot print
high speed draft	90 dpi	72 dpi	No
Draft	120 dpi	72 dpi	No
Draft condensed	240 dpi	720 dpi	No
Draft emphasized	120 dpi	72 dpi	Yes
NLQ	240 dpi	144 dpi	No
Bit image	60,72,80,90 or 120 dpi	72 dpi	Yes
	120 or 240 dpi	72 dpi	No

PRINTABLE AREA

❑ Cut sheet

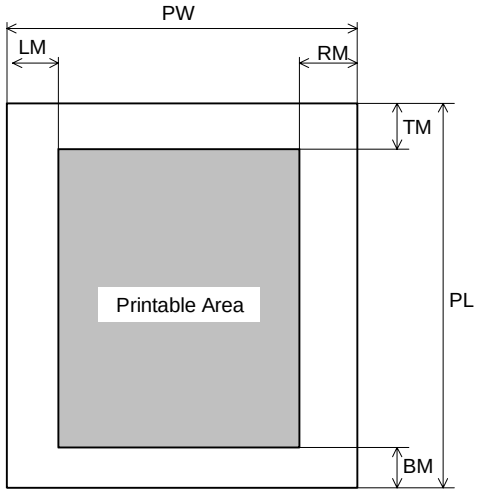


Figure 1-1. Printable Area (Cut sheet)

Table 1-3. Printable Area (Cut Sheet)

	Single sheet	Multi part
Width (PW)	Refer to Paper / Media	Refer to Paper / Media
Length (PL)	Refer to Paper / Media	Refer to Paper / Media
Left margin (LM)	3mm or more (PW≤364mm) 25mm or more (PW=420mm)	3mm or more (PW≤364mm) 25mm or more (PW=420mm)
Right margin (RM)	3mm or more (PW≤364mm) 25mm or more (PW=420mm)	3mm or more (PW≤364mm) 25mm or more (PW=420mm)
Top margin (TM)	4.2mm or more	4.2mm or more
Bottom margin (BM)	4.2mm or more	4.2mm or more

Notice : Maximum horizontal printable area is 345.2mm.

❑ Envelope

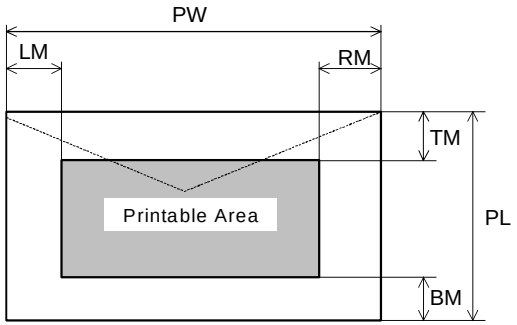


Figure 1-2. Printable Area (Envelope)

Table 1-4. Printable Area (Envelope)

	Envelope
Width (PW)	Refer to Paper / Media
Length (PL)	Refer to Paper / Media
Left margin (LM)	3mm or more
Right margin (RM)	3mm or more
Top margin (TM)	4.2mm or more
Bottom margin (BM)	4.2mm or more

❑ Continuous paper

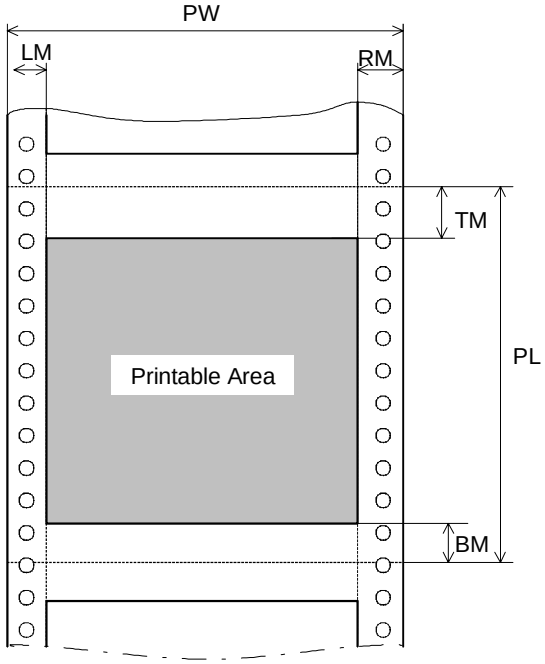


Figure 1-3. Printable Area (Continuous paper)

Table 1-5. Printable Area (Continuous paper)

	Envelope
Width (PW)	Refer to Paper / Media
Length (PL)	Refer to Paper / Media
Left margin (LM)	3mm or more
Right margin (RM)	3mm or more
Top margin (TM)	4.2mm or more
Bottom margin (BM)	4.2mm or more

❑ Roll paper

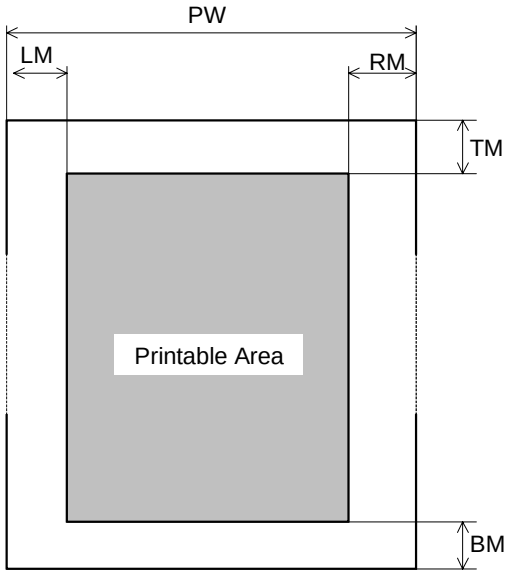


Figure 1-4. Printable Area (Roll paper)

Table 1-6. Printable Area (Continuous paper)

	Envelope
Width (PW)	Refer to Paper / Media
Length (PL)	Refer to Paper / Media
Left margin (LM)	3mm or more
Right margin (RM)	3mm or more
Top margin (TM)	4.2mm or more
Bottom margin (BM)	4.2mm or more

PAPER HANDLING

Feeding method	Friction feed	Front / Rear	
	Push tractor feed	Front / Rear	
	Push & Pull tractor feed	Front / Rear	
	Pull tractor feed	Front / Rear / Bottom	
Optional Feeding	CSF Bin 1 / Bin 2 feed		
	Pull Tractor feed		
	Roll paper feed	Rear	
Paper path	Manual insertion	Front / Rear in , Top out	
	CSF	Rear in, Top out	
	Tractor	Front / Rear / bottom in, Top out	
Feed speed	Normal	61ms	(1/6inch feed)
		0.127MPS or 5.0IPS	(continuous)
	Copy mode	83ms	(1/6inch feed)
		0.078MPS or 3.1IPS	(continuous)

PAPER / MEDIA

❑ Single sheet

Table 1-7. Paper Specification (Single sheet)

	Front entry		Rear entry	
	Minimum	Maximum	Minimum	Maximum
Width (inch)	3.9	16.5	3.9	16.5
(mm)	100	420	100	420
Length (inch)	5.8	16.5	3.9	16.5
(mm)	148	420	100	420
Thickness				
(inch)	0.0025	0.0055	0.0025	0.0055
(mm)	0.065	0.14	0.065	0.14
Weight (g/m^2)	52	90	52	90
(lb)	14	24	14	24
Quality	Plain paper, Recycled paper Not curled / Not folded / Not crumpled		Plain paper, Recycled paper Not curled / Not folded / Not crumpled	

Notice : Recycled paper printing is available only under normal temperature and humidity condition.

❑ Multi part

Table 1-8. Paper Specification (Multi part sheet)

	Front entry		Rear entry	
	Minimum	Maximum	Minimum	Maximum
Width (inch) (mm)	3.9 100	16.5 420	3.9 100	16.5 420
Length (inch) (mm)	5.8 148	16.5 420	3.9 100	16.5 420
Copies	Original + 5		Original + 5	
Total Thickness (inch) (mm)	 0.0047 0.012	 0.018 0.46	 0.0047 0.012	 0.018 0.46
Weight (g/m^2) (lb)	40 12	58 15	40 12	58 15
Quality	Plain paper, Recycled paper Not curled / Not folded / Not crumpled		Plain paper, Recycled paper Not curled / Not folded / Not crumpled	
Jointing	Line glue at the top or one side of form		Line glue at the top of form	

Table 1-9. Paper Specification (Multi part sheet)

		Front entry		Rear entry	
		Min.	Max.	Minimum	Maximum
Envelope No. 6	Width (inch) (mm)	—		6.5 165	
	Length (inch) (mm)	—		3.9 92	
Envelope No. 10	Width (inch) (mm)	—		9.5 241	
	Length (inch) (mm)	—		4.1 105	
Total Thickness (inch) (mm)		—		0.0063 0.16	0.020 0.52
Weight (g/m^2) (lb)		—		40 12	58 15
Quality		—		BOND paper, Plain paper or AIR MAIL Not curled / Not folded / Not crumpled	

Notice : Envelope printing is available only under normal temperature and humidity condition.
Notice : Envelope should be inserted from rear entrance only.
Notice : Envelope setting is landscape direction.

❑ Envelope

❑ Continuous paper

Table 1-10. Paper Specification (Continuous paper)

	Front entry		Rear entry		Bottom entry	
	Min.	Max.	Min.	Max.	Min.	Max.
Width (inch)	4	16	4	16	4	16
(mm)	101.6	406.4	101.6	406.4	101.6	406.4
Length (inch)	4	22	4	22	4	22
(mm)	101.6	558.8	101.6	558.8	101.6	558.8
Copies	Original + 5		Original + 5		Original + 5	
Total Thickness (inch)	0.0025	0.018	0.0025	0.018	0.0025	0.018
(mm)	0.065	0.046	0.065	0.046	0.065	0.046
Weight (Without Multi part) (g/m^2)	52	82	52	82	52	82
(lb)	12	22	12	22	12	22
Weight (one sheet of Multi part) (g/m^2)	40	58	40	58	40	58
(lb)	12	15	12	15	12	15
Quality	Plain paper, Recycled paper, Carbonless multi part paper					
Jointing	Point glue or paper staple (both side)					

Notice : Original + 6 copies paper is available in pull tractor feed.

❑ Continuous paper with labels

Table 1-11. Paper Specification (Continuous paper with Labels)

	Front entry		Rear entry		Bottom entry	
	Min.	Max.	Min.	Max.	Min.	Max.
Label size (inch)	15/16 × 2.5		—		15/16 × 2.5	
(mm)	23.8 × 63.5				23.8 × 63.5	
Width (inch)	4	16	—		4	16
(mm)	101.6	406.4			101.6	406.4
Length(inch)	4	22	—		4	22
(mm)	101.6	558.8			101.6	558.8
Base sheet Thickness (inch)	0.0028	0.0035	—		0.0028	0.0035
(mm)	0.07	0.09			0.07	0.09
Total Thickness (g/m^2)	0.0063	0.0075	—		0.0063	0.0075
(lb)	0.16	0.19			0.16	0.19
Label Weight (g/m^2)	68		—		68	
(lb)	17				17	
Quality	A VERY CONTINUOUS FORM LABEL, A VERY MINI-LINE LABELS or the same quality labels		—		A VERY CONTINUOUS FORM LABEL, A VERY MINI-LINE LABELS or the same quality labels	

Notice : Original + 6 copies paper is available in pull tractor feed.
Notice : The base sheet of label must be continuous paper.
Notice : The continuous paper with labels should be inserted from front or bottom entrance.

❑ Roll paper

Table 1-12. Paper Specification (Multi part sheet)

		Front entry		Rear entry	
		Min.	Max.	Minimum	Maximum
Width	(inch)	—		8.5	
	(mm)			216	
Length	(inch)	—		—	
	(mm)				
Thickness					
	(inch)	—		0.0028	0.0035
	(mm)			0.07	0.09
Weight	(g/m^2)	—		52	82
	(lb)			14	22
Quality		—		Plain paper Not curled / Not folded / Not crumpled	

INTERFACE

Standard	Bi-directional parallel interface (IEEE-1284 nibble mode)
Option	Type-B interface level 2

SOFTWARE SPECIFICATION

Control code	ESC/P IBM 2381 Plus Emulation	
Fonts	2 LQ & 1 draft Bitmap typefaces 8 Barcode fonts	
Character table	Standard version	11 tables
	NLSP version	20 tables
Input buffer	64 kB	

ENVIRONMENT CONDITION

Temperature	5 - 35°C	(Operation)
	15 - 25°C	(Recycled paper, envelope, label or roll paper printing)
	-30 - 60°C	(Non-operation)
Humidity	10 - 80%RH	(Operation)
	30 - 60%RH	(Recycled paper, envelope, label or roll paper printing)

ELECTRICAL SPECIFICATION

120V version

Rated voltage	AC120V
Input voltage range	AC 99 - 132V
Rated frequency range	50 - 60Hz
Input frequency range	49.5 - 60.5Hz
Rated current	1.0A (max. 1.8A)
Power consumption	Approx. 46W (ISO/IEC10561 Letter pattern) Energy Star program compliant
Insulation resistance	10MΩ min. (AC line - Chassis, 500V)
Dielectric strength	AC1000V rms 1 minute or AC1200V rms 1 second (AC line - Chassis)

230V version

Rated voltage	AC220 - 240V
Input voltage range	AC 198 - 264V
Rated frequency range	50 - 60Hz
Input frequency range	49.5 - 60.5Hz
Rated current	0.5A (max. 0.9A)
Power consumption	Approx. 46W (ISO/IEC10561 Letter pattern) Energy Star program compliant
Insulation resistance	10MΩ min. (AC line - Chassis, 500V)
Dielectric strength	AC1500V rms 1 minute (AC line - Chassis)

UPS (Universal Power Supply) version

Rated voltage	AC100-120V	/	AC220 - 240V
Input voltage range	AC90 - 132V	/	AC 198 - 264V
Rated frequency range	50 - 60Hz		
Input frequency range	49.5 - 60.5Hz		
Rated current	1.1A (max.1.8A)	/	0.5A (max. 0.9A)
Power consumption	Approx. 46W (ISO/IEC10561 Letter pattern) Energy Star program compliant		
Insulation resistance	10MΩ min. (AC line - Chassis, 500V)		
Dielectric strength	AC1500V rms 1 minute (AC line - Chassis)		

PHYSICAL SPECIFICATIONS

Dimensions	639mm(W) × 402mm(D) × 257mm(H)
(with CSF bin1)	639mm(W) × 469mm(D) × 380mm(H)
(with CSF bin2)	639mm(W) × 598mm(D) × 411mm(H)
Weight	Approx. 13kg
(with CSF bin1)	16.3kg
(with CSF bin2)	17.2kg

RELIABILITY

Total print volume	7.5 million lines (except printhead)
MTBF	10000POH
Printhead life	Approx. 300 million characters

SAFETY APPROVAL

120V version

Safety standard	UL1950
	CSA C22.2 No.950
EMI	FCC part 15 subpart B class B
	CSA C108.8 class B

230V version

Safety standard	EN60950 (TÜV, NEMKO)
EMI	EN55022(CISPR pub.22) class B
	AS/NZS 3548 class B

UPS version

Safety standard	UL1950
	CSA C22.2 No.950
	EN60950 (TÜV, NEMKO)
EMI	FCC part 15 subpart B class B
	CSA C108.8 class B
	EN55022(CISPR pub.22) class B
	AS/NZS 3548 class B

CE MARKING

❑ 230V version & UPS version

Low Voltage Directive 73/23/EEC	EN60950
EMC Directive 89/336/EEC	EN55022 class B
	EN61000-3-2
	EN61000-3-3
	EN50082-1
	IEC801-2
	IEC801-3
	IEC801-4

ACOUSTIC NOISE

Level	Approx. 55 dB(A)	(ISO 7779 pattern)

INK RIBBON CARTRIDGE

Type	Fabric
Color	Black
Ribbon life	Approx. 12 million characters
	(Draft 10cpi, 14 dot/characters)

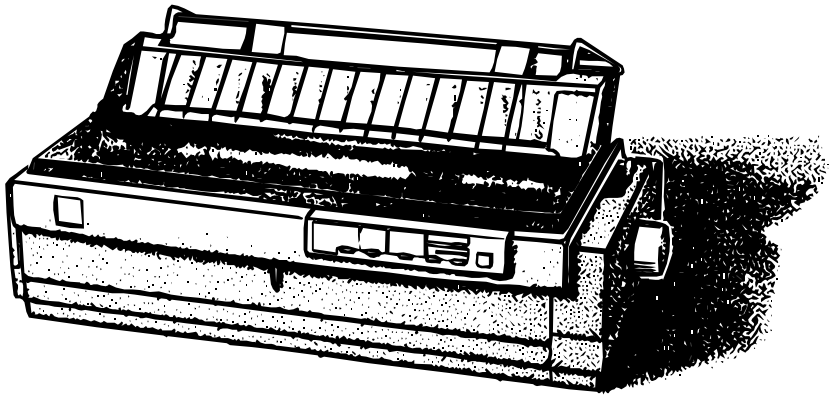


Figure 1-5. Exterior View of the FX-2180

1.2 OPERATION

This section describes user operation.

1.2.1 Control Panel Operation

This printer's operation panel contains seven switches and nine LED lamps, as shown below;

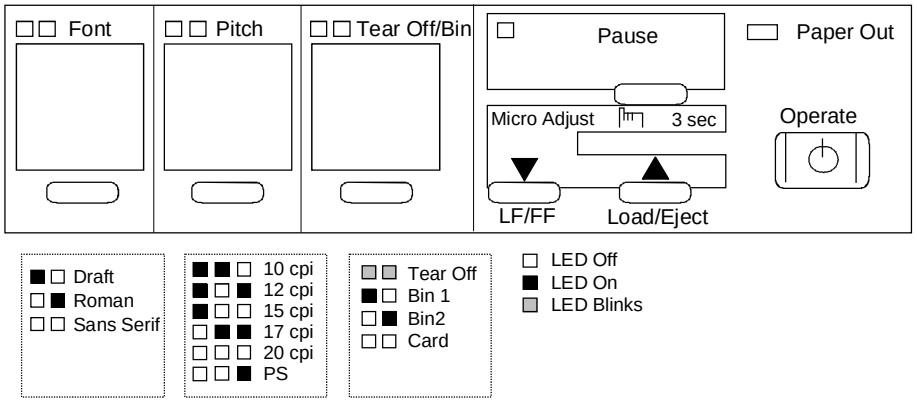


Figure 1-6. Control Panel

1.2.1.1 Switches

- **Operate**

  This switch turns the printer on / off. It is set in the secondary circuit of the power supply board.

⚠WARNING ***As this operate switch is secondary switch, the primary circuit of power supply circuit is hot condition when the power cable is connected in AC line.***

- **Pause**
  - This switch alternates the printer activity between on line and off line.
  - Hold it down over 3 seconds when the printer is in stand-by condition, and the Micro Adjust functions is enabled. If the switch is pressed again, this function is disabled.
- **Load / Eject**
  - Pressing it loads cut sheet or continuous paper when the printer is out of paper.
  - Pressing it eject cut sheet to the stacker or continuous paper to the paper park.
- **LF / FF**
  - Pressing it shortly executes line feed.
  - Holding it down for a few seconds executes form feed when continuous paper is used, or eject cut sheet to the stacker when cut sheet is used.
- **Tear Off**

  When continuous paper is used, pressing it moves a page to the tear off position. And pressing it again moves to the next page TOF position.
- **Bin**

  This switch selects CSF bin number or the Card mode* when cut sheet is used.

  "*": Card mode is for post card or envelope using.
- **Font**

  This switch selects one font of Draft, Roman and Sans serif.
- **Pitch**

  This switch selects one pitch of 10cpi, 12cpi, 15cpi, 20cpi and Proportional Spacing.

- **Micro Adjust ↑ / ↓**
  - These switches are effective when the micro adjust function is enable by Pause switch.
    Micro Adjust function executes micro feed backward or forward by 1/216 inch.
  - TOF adjustment is enable in the TOF position after loading, and Tear-off adjustment is enable in the Tear-off position.

1.2.1.2 Lamps

- **Pause** (Orange)
  - It is on when the printer is in pause, and it is off when the printer is on line condition.
  - It blinks when the Micro Adjust function is enabled or printhead is in hot condition.
- **Paper Out** (Red)
  It is on when the printer is in the paper out condition, and it is off when the paper is set in the printer.
- **Tear Off / Bin** (Green)
  - Only right LED is on when CSF bin1 is selected.
  - Only left LED is on when CSF bin 2 is selected.
  - Both LEDs are on when Card mode is selected.
  - Both LEDs blink when continuous paper is in the Tear-Off position.
  - Both LEDs are off when continuous paper is out of the Tear-Off position.
- **Font** (Green)
  The font LEDs consist of two LEDs. The current using font is shown by these two LEDs on/ off combinations.
- **Pitch** (Green)
  The pitch LEDs consist of three LEDs. The current using pitch is shown by these three LEDs on/ off combinations.

1.2.2 Buzzer

This printer makes buzzer sounds when it discover error or illegal condition, as listed below:

- **Paper Out error**
  Approx.100ms buzzer sounds three times with two intervals of approx.100ms.
- **Cover open error**
  Approx.100ms buzzer sounds three times with two intervals of approx.100ms.
- **Release lever operation error**
  Approx.100ms buzzer sounds five times and approx.100ms interval is four times.
- **Illegal panel operation**
  One approx.100ms buzzer sounds.

1.3 SPECIAL FUNCTION

This printer provides the special functions to extend the printer abilities for customers as followings,

1.3.1 Operation at power on

This function is executed when one or more switches are holding down and power on continue at same time. Then, the printer performs special function.

1.3.1.1 Self Test

This function is useful to check the printing function on itself.

- ❑ LNQ Self Test
  Turning on the printer while holding down **Load / Eject** switch, the printer prints self test pattern with NLQ fonts. If desire to stop it, turn off the printer once.
- ❑ Draft Self Test
  Turning on the printer while holding down **FF / LF** switch, the printer prints self test pattern with NLQ fonts. If desire to stop it, turn off the printer once.

1.3.1.2 Default Setting

Several printer settings loaded at power-on can be changed in this operation.

- ❑ Setting Method
  The setting method is shown in the flowchart as following,

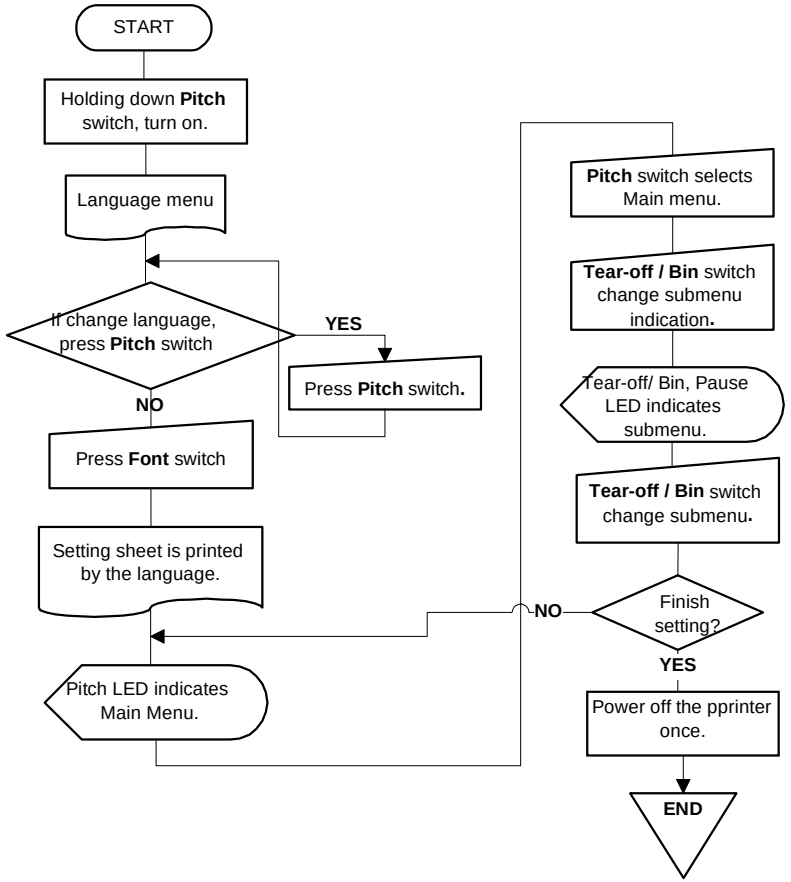


Figure 1-7. Default Setting Flowchart

❑ Setting menu

Table 1-13. Factory setting

Item	Factory Setting Value
Character Table	Standard version: PC437
	NLSP version: PC437
International character set for Italic table	Italic U.S.A
Page length for front tractor	11inch
Page length for rear tractor	11inch
High Speed Draft	On
Print direction	Bi-D
Software	ESC/P
I/F mode	Auto
Auto I/F Wait Time	10sec.
Input Buffer	On
Skip Over Perforation	Off
Auto Tear off	Off
Auto Line Feed	Off
Auto CR Return (IBM 2381 Plus only)	Off
0 Slash	Off
Buzzer	On
IBM Character Table	Table 2

1.3.1.3 Data Dump

Turning on the printer while holding down **Load / Eject** and **LF / FF** switches, the printer starts Hex. Data printing. desire to return normal print mode, turn off the printer once.
This mode is useful to check data translation between the printer and the host computer.

1.3.1.4 Clear EEPROM

Turning on the printer while holding down **Font** and **Tear off/ Bin** switches, The data of EEPROM Area 1 are reset to the factory setting without driving line count, driving hour, driving line counter for ribbon changing timing, starting year, starting month and starting date. (Refer to the FX-2180 Specifications.)

⚠CAUTION ***This printer always stores driving line count, driving hour, driving line counter for ribbon changing timing, starting year, starting month and starting date in EEPROM on the main board***

1.3.1.5 Clear EEPROM for driving line counter for ribbon changing timing

Turning on the printer while holding down **LF / FF** and **Tear off/ Bin** switches, The driving line counter for ribbon changing timing of EEPROM is reset to zero.

1.3.1.6 Alternate copy mode

Turning on the printer while holding down **Font** switch, the printer alternates copy mode on or off.

- When “off” is selected, beeps one time.
- When “on” is selected, beeps two times.

When the printer gets into copy mode in pull tractor feed, normal temperature and paper thickness lever position 4 or more, it prints draft and bit image with double strike printing. But it may not become two pass printing

1.3.1.7 Bi-D Adjustment

Using this function, the customer can performs Bi-directional adjustment easily.

❑ Adjusting Method
The setting method is shown in the flowchart as following,

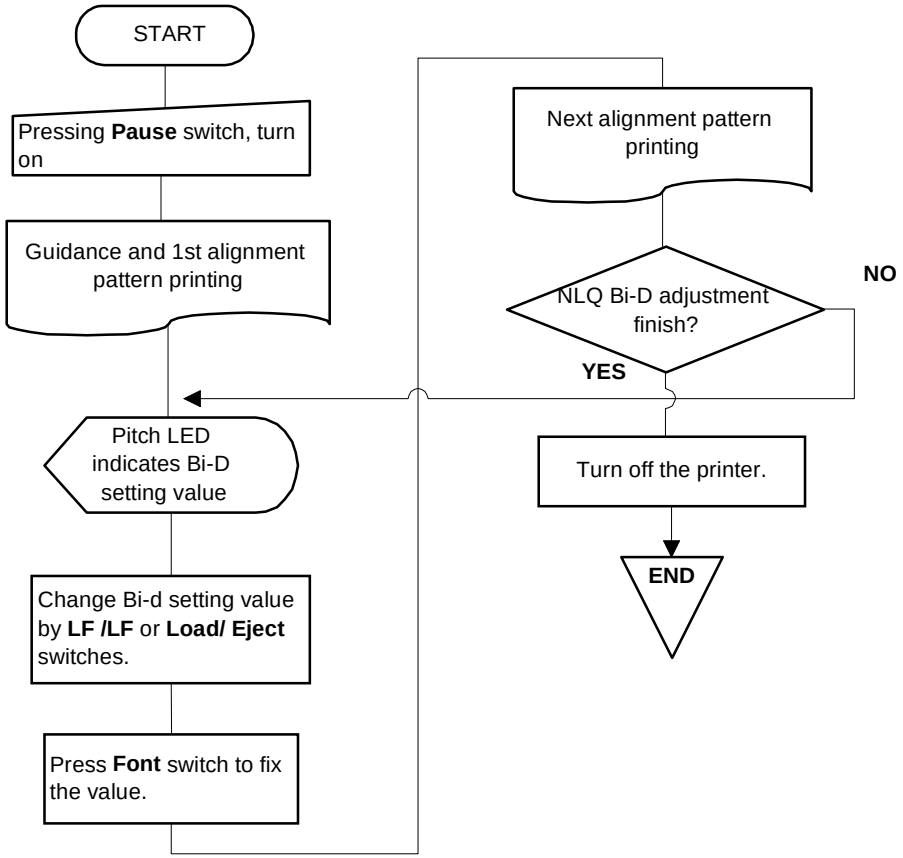

START
Pressing **Pause** switch, turn on
Guidance and 1st alignment pattern printing
Pitch LED indicates Bi-D setting value
Change Bi-d setting value by **LF /LF** or **Load/ Eject** switches.
Press **Font** switch to fix the value.
Next alignment pattern printing
NLQ Bi-D adjustment finish?
NO
YES
Turn off the printer.
END

Figure 1-8. Bi-D Adjustment Method

CAUTION ***Bi-D adjust value is not reset by clearing EEPROM.***

1.4 CONSUMABLES & OPTIONS

1.4.1 Consumables

Ribbon cartridge	S015086
Ribbon pack	S010033

1.4.2 Options

High capacity cut sheet feeder (bin 1)	C80673*
Second bin cut sheet feeder	C80674*
Pull tractor unit	C80032*
Roll paper holder	#8310
Serial I/F card	C82305* / C82306*
32KB intelligent serial I/F card	C82307* / C82308*
32KB intelligent parallel I/F card	C82310* / C82311*
Local Talk I/F card	C82312*
32KB IEEE-488 I/F card	C82313*
Coax I/F card	C82314*
Twinax I/F card	C82315*
IEEE-1284 parallel I/F card	C82345*
Ethernet I/F card	C82357*

CHAPTER

2

OPERATING PRINCIPLES

2.1 OVERVIEW

This printer consists of the printer mechanism, the power supply circuit, the control circuit, operation panel, housing and etc,. The operating principles of main components are described in this chapter as followings;

2.1.1 Printer Mechanism

The printer mechanism of this printer consists of following several unit;

- ❑ Printhead
  The printhead prints the dots on the paper via ink ribbon by printing data from the control circuit.
- ❑ Carriage mechanism
  This mechanism consists of carriage unit, carriage motor (CR Motor), timing belt, driven pulley, CR guide shaft and etc. The carriage unit carries the printhead and move along the CR guide shaft between left end and right end of the printable area by this mechanism.
- ❑ Platen gap mechanism
  The platen gap (the gap between platen and printhead) are adjusted to make good print quality between different thickness paper. This mechanism consists of CR guide shaft, PG adjust bushing which eccentric with CR guide shaft center, and PG adjust lever. It makes the printhead associate with platen or keep away from platen causing from PG adjust lever position.
- ❑ Paper feed mechanism
  This mechanism consists of paper feed motor (PF Motor), rear / front tractors, platen, and etc. This mechanism picks up the cut sheet paper , feed the cut sheet paper, or continuous paper to the printhead to print paper by PF Motor. And, printed paper feeds out from the printer.
- ❑ Disengage mechanism
  This mechanism consists of two disengage gears. It switches the paper feed torque from PF motor to the tractors or paper feed rollers according to paper feeding methods (ex. friction feeding, front push tractor feeding, rear tractor feeding, pull tractor feeding, push-pull tractor feeding).
- ❑ Ribbon advance mechanism
  This mechanism consists of ribbon feed roller, Driven pulley and etc. This mechanism winds up ink ribbon for one way and make new ribbon surface to appear for printing by carriage motion.

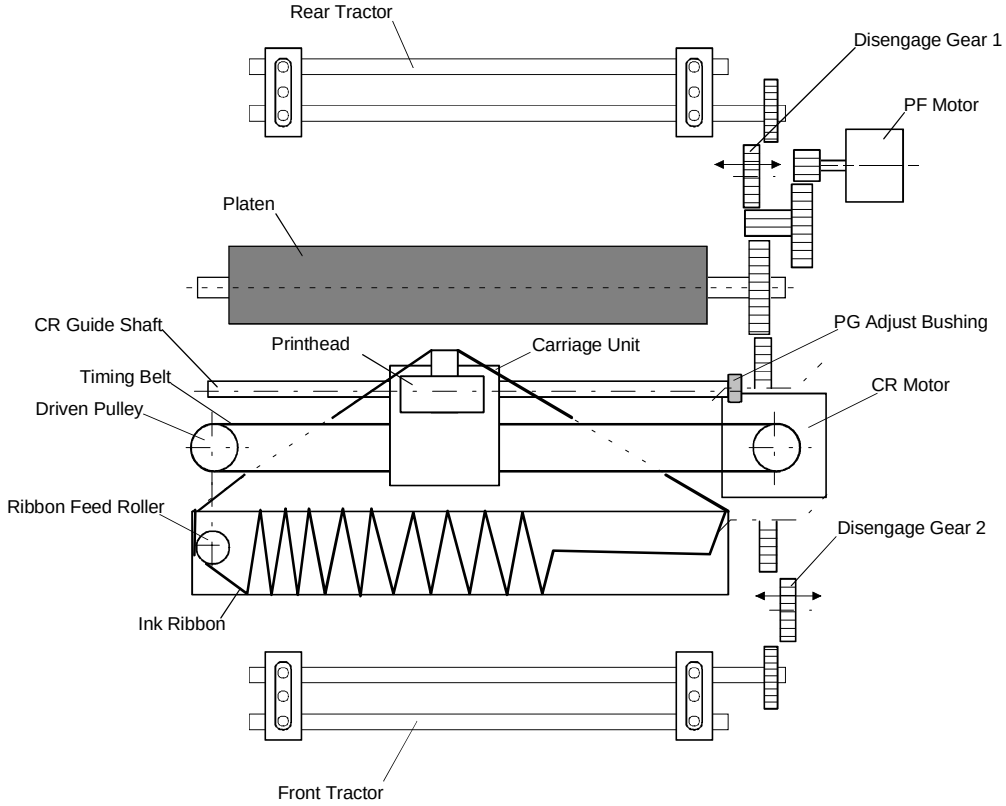


Figure 2-1. Printer Mechanism

2.1.2 Power Supply Circuit

This printer can be powered between three power supply boards: the C166PSB(120V), C166PSE(220-240V) and C244PSH(120V/220-240V). The function of these boards s the same, except for a different in a primary circuit. The input voltages and fuse ratings for these boards are shown below;

Table 2-1. Power Supply Board

Board	Input Voltage	Fuse F1 Rating
C166PSB	103.5 - 132V	3.15A / 125V
C166PSE	198 - 264V	T2.0AH / 250V
C244PSH	85 - 138V / 187 - 276V	5HT4

2.1.2.1 Power Supply Overview

The power supply board has two DC power outputs for control circuit and printer mechanism. These power outputs are listed on following table;

Table 2-2. Power Supply Outputs Applications

Output Voltage	Applications
+5VDC	• Control Circuit board Logic • Detectors • Operation Panel LEDs
+35VDC	• CR Motor • PF Motor • Printhead

The block diagram of power supply circuit is shown following figure. When AC power enters the printer from external power source, the filter circuit removes the noise. Then AC voltage undergoes full-wave rectification and smoothed to produce direct voltage. But, in case of C244PSH board, the AC voltages undergoes the voltage doubler rectification automatic switching IC and smoothed to produce direct voltage. The voltage is fed to the gate port for the switching FET (Q1)through resistors (R18 and R31), and then the switching circuit operates.
The secondary smoothing circuit produces a stepped down +35VDC voltage. The +5VDC is generated and stabled by feeding the +35VDC voltage through the +5VDC power supply circuit IC. As this power supply circuit composed of an ZC-RCC (zero cross ringing choke converter), it realizes to the circuit high stability, efficiency and portability.
This circuit provides the power switch (operate switch) in the secondary circuit system. The operate switch on the operation panel controls the power supply circuit.
There is +35v line constant voltage control circuit and over current / voltage circuits in order to protect the printer and control circuit.

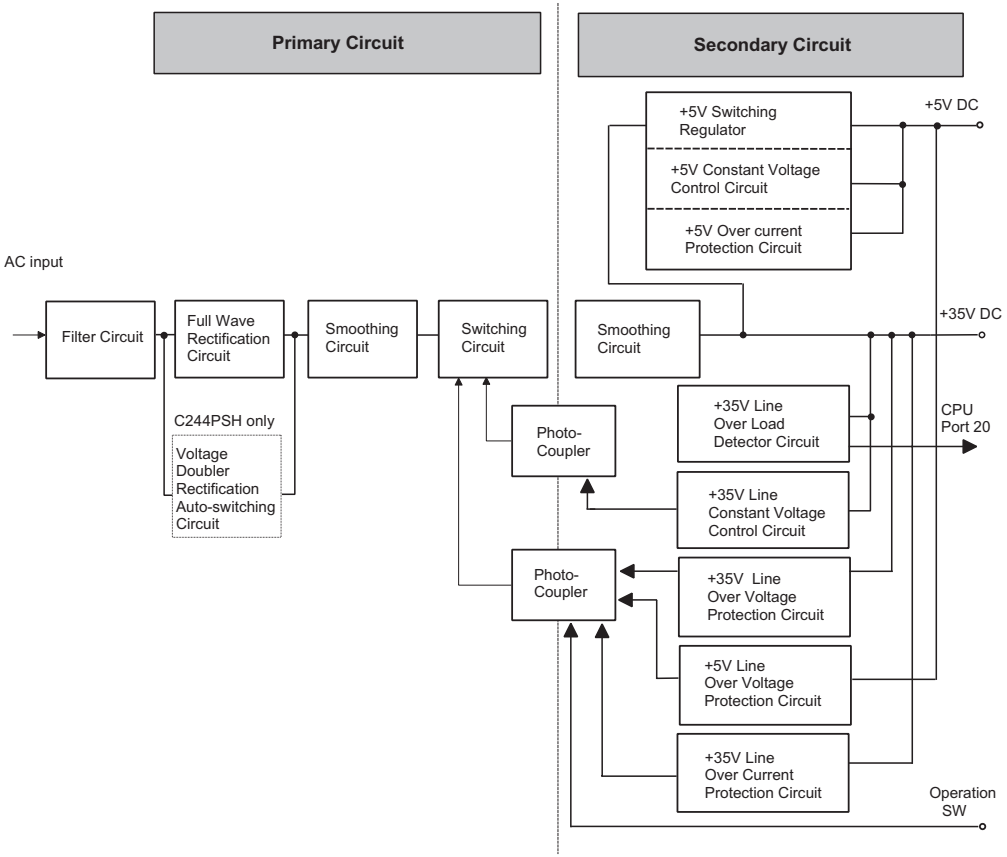


Figure 2-2. Power Supply Circuit Block Diagram

2.1.3 Control Circuit

The control circuit consists of C244MAIN control board and the operation panel board.

2.1.3.1 Overview of Control Circuit Operation

This printer's control circuit includes a TMP96C141BF that ran at 17.20MHz, an E05B50** gate array, a 2Mbit PROM (or 2M / 4Mbit Flash-ROM), a 1Mbit / 4Mbit PS-RAM (or SRAM), a serial EEPROM (or parallel EEPROM) and other circuits. This control circuit oversees control of all the components in the printer. The following chart shows the control circuit block diagram.

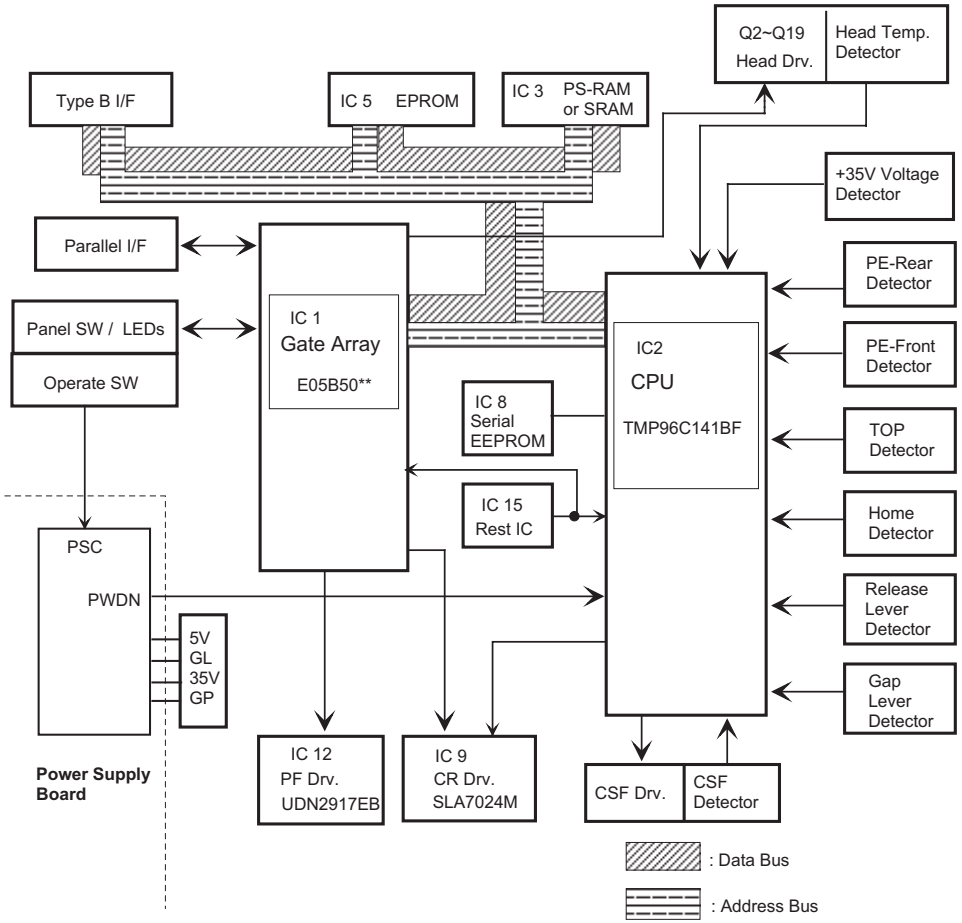


Figure 2-3. Control circuit Block Diagram

The functions of main components of control circuit on C244MAIN board are shown on the following table.

Table 2-3. Functions of Main Components

IC	Location	Function
Gate array (E05B50**)	IC1	Control the functions below; • System control • Peripheral device control
CPU (TMP96C141BF)	IC2	• Receives data from the host computer and send it to the input buffer in RAM. • Extend the input data held in the buffer to create Image data. • Load image data to the image data buffer. • Transfer image data to the printhead.
1 / 4Mbit PS-RAM	IC3	Buffer and working area
2Mbit PROM	IC5	The ROM contains the program that runs the CPU and character tables.
Serial EEPROM (AT93C46)	IC8	Contains following data; • Default setting values • Market data • Mechanism & printhead parameter, etc
SLA7024M	IC9	CR motor drive IC
A2917SEB	IC12	PF motor drive IC
Reset IC (BH6150F)	IC15	This IC generates the reset signal at power on or down, and makes reset the CPU and the gate array.

CHAPTER

3

TROUBLESHOOTING

3.1 OVERVIEW

This chapter contains flowcharts and check point tables that are helpful for troubleshooting the printer. The flowcharts facilitate identifying faulty units or parts from abnormal symptoms. The checkpoints provides unit characteristics, such as resistance, continuity, and so on, to which you can refer when isolating faulty units or parts.

3.2 TROUBLESHOOTING INFORMATION

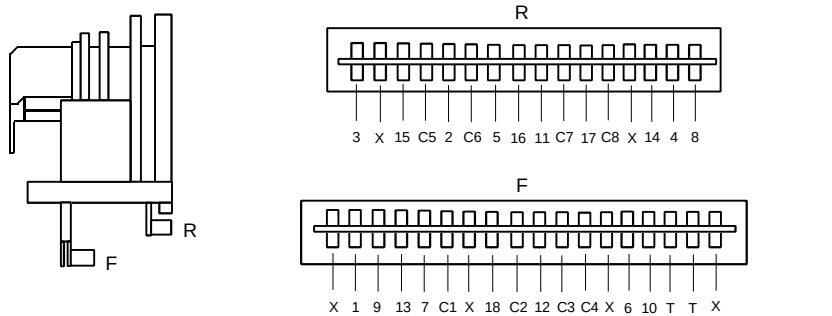
This section describes troubleshooting information to let you find the point of replaceable unit or part.

3.2.1 Printhead

It is easy to check if a printhead is defective or not. Referring to the following table and figure, measure the printhead coil resistance and check if it is correct

Table 3-1. Printhead coil Resistance Test Points

Common Pin No	Refer to the following figure.
Test Pin No.	Refer to the following figure.
Test Method (Set meter to ohms. Disconnect the printhead after the printer is powered off.)	Place one lead on each pin and the other lead on each common pin.
Meter Reading	± 1.64 Ω (at 25°C)



F				
COM.	C1	C2	C3	C4
Pin No,	1, 7, 13	9	10, 18	6, 12

R				
COM.	C5	C6	C7	C8
Pin No,	2, 5, 11	3, 15	16, 17	4, 8, 14

T : Thermistor terminal
X : Not used

Figure 3-1. Printhead Connenctor Pin Alignment

3.2.2 Detectors

Table 3-2. Detector Test Point

Detector CN No.	Test Pin No.	Test Method (Set Meter to DC Voltage)	Meter Reading
CN4 (HP Detector)	1 : HP 2 : GND 3 : +5V	Place one lead on pin 1 and the other lead on pin 2, and check the voltage while blocking two detector terminal.	• Open : +5V (Home position) • Short : 0V (Out of home)
CN5 (Rear PE Detector)	1 : +5V 2 : PE 3 : GND	Place one lead on pin 2 and the other lead on pin 3, and check the voltage while toggling the detector lever.	• Open : +5V (Paper loaded) • Short : 0V (No paper)
CN6 (Front PE Detector)	1 : PE 2 : GND	Place one lead on pin 1 and the other lead on pin 2, and check the voltage while toggling the detector lever.	• Open : +5V (Paper loaded) • Short : 0V (No paper)
CN7 (TOP Detector)	1 : E 2 : GND 3 : +5V 4 : A	Place one lead on pin 1 and the other lead on pin 2, and check the voltage while inserting and removing paper between the detector.	• Open : 0V (No paper) • Short : +5V (Paper loaded)

Table 3-3. Detector Test Point (continue.)

Detector CN No.	Test Pin No.	Test Method (Set Meter to DC Voltage)	Meter Reading
CN12 (Release Detector 1 / 2)	1 : Release 1 2 : GND 3 : Release 2 4 : GND	Place one lead on pin 1 and the other lead on pin 2, and check the voltage while toggling the release lever. Place one lead on pin 3 and the other lead on pin 4, and check the voltage while toggling the release lever.	• Open : +5V • Short : 0V
CN13 (PG Detector 1/ 2)	1 : PG1 2 : GND 3 : PG2 4 : GND	Place one lead on pin 1 and the other lead on pin 2, and check the voltage while toggling the PG detector lever.	• Open : +5V • Short : 0V
CN2 on Panel board (Case Open Detector)	1 : COPEN 2 : GND	Place one lead on pin 2 and the other lead on pin 3, and check the voltage while toggling the detector lever.	• Open : +5V (Case opened) • Short : 0V (Case closed)

3.2.3 Motors

Table 3-4. Motor Test Point

PF Motor	
Motor connector No.	CN10
Com-mon Pin No.	—
Test Pin No	1,2,3,4
Test Method (Set meter to horms. Disconnect the motor from control board after the printer is powered off.)	Place one lead on pin 1 and the other lead on pin 3. Place one lead on pin 2 and the other lead on pin 4.
Meter Reading	16.1 Ω ± 10% (per phase, at 25°C)
CR Motor	
Motor connector No.	CN11
Com-mon Pin No.	5
Test Pin No	1,2,3,4
Test Method (Same as for the PF Motor)	Place one lead on pin 5 and the other lead on each of 4 pins.
Meter Reading	2.7 Ω ± 10% (per phase, at 25°C)

3.2.4 Error Codes with Indications and Buzzer

Table 3-5. Error Codes with Indications and Buzzer

Error Condition	Indicators					Buzzer*
	Pause	Paper Out	Tear Off/Bin	Pitch	Font	
Paper out	On	On	—	—	—	❍ × 3
Paper jam (Paper ejected in-completely)	On	Blinks	—	—	—	❍ × 3
Head hot	Blinks	—	—	—	—	—
Case open	On	—	—	—	—	❍ × 3
Fatal error	Blinks	Blinks	Blinks	Blinks	Blinks	● × 5

* : ❍ Indicates that the beep sounds for 100ms with an interval of 100ms.
● Indicates that the beep sounds for 500ms with an interval of 100ms.

3.3 UNIT LEVEL TROUBLESHOOTING

You may be able to identify the defective unit just from the symptom displayed. The table below provides the symptoms for a number of failures. Once you identify the problem, refer to the flowchart listed in the right-hand column of the table to determine the cause of the problem.

Table 3-6. Symptoms and Problem Descriptions

Symptom	Problem Description	Flowchart No.
Abnormal CR Operation	• Carriage dose not move at all. • When the printer is powered on, the CR moves away from home position after a moment and stops. All indicator LEDs on the control panel blinks.	Flowchart 1
Abnormal Paper Feed	• Paper is not fed at all. • When the printer is power on, paper ejected automatically. • when paper is loaded, it is ejected automatically and then the printer indicates “Ready”.	Flowchart 2-1, 2-2
Abnormal Control Panel Operation	• Control panel indicator LEDs do not light. • Operate switch does not work. • Panel switches do not work.	Flowchart 3
Abnormal Printing	• No image is printed. • Faulty printing - some dots are not printing.	Flowchart 4

The repair procedure flowcharts use the following symbols:

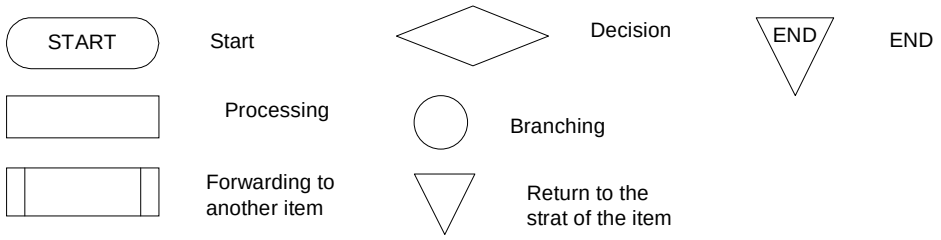


Figure 3-2. Flowchart Symbols

1. Abnormal CR Operation

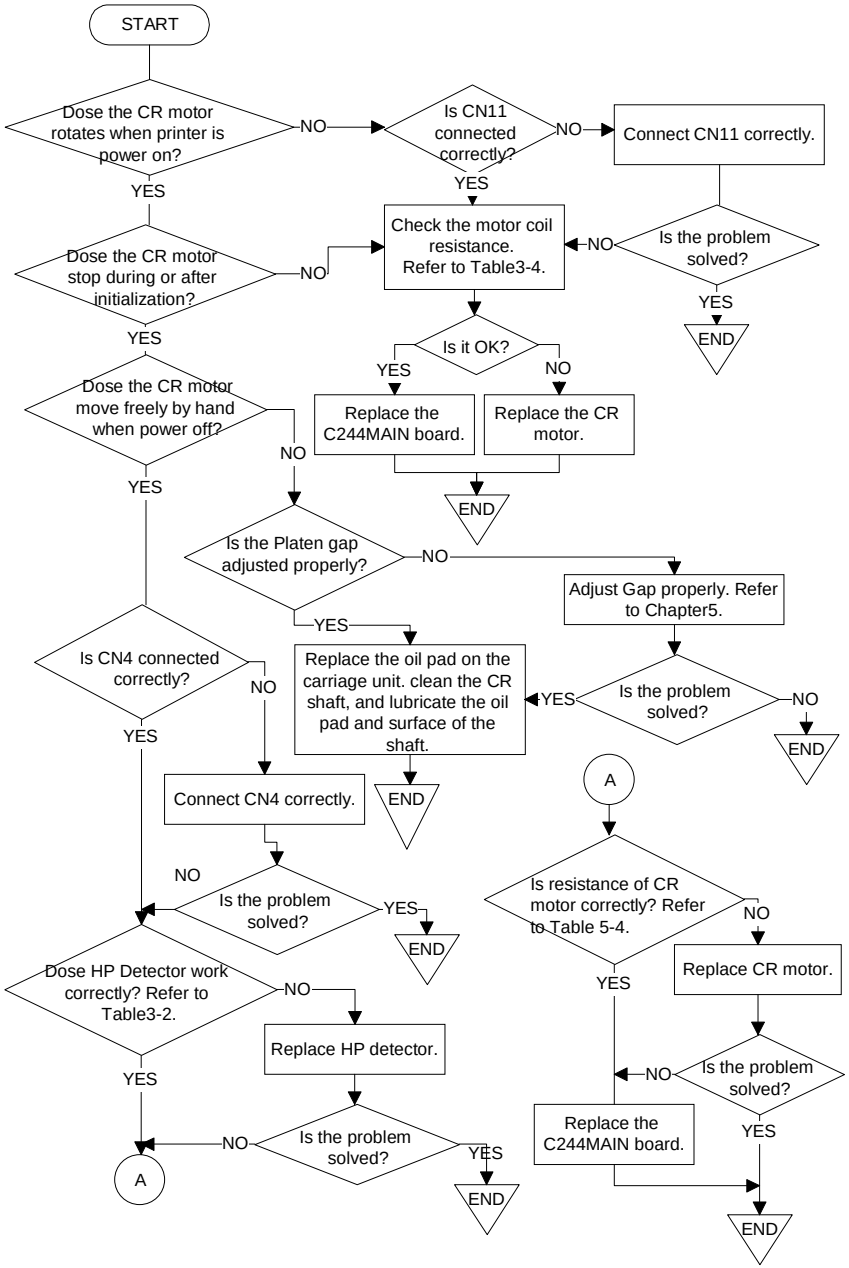


Figure 3-3. Flowchart 1

2. Abnormal Paper Feed Operation - 1

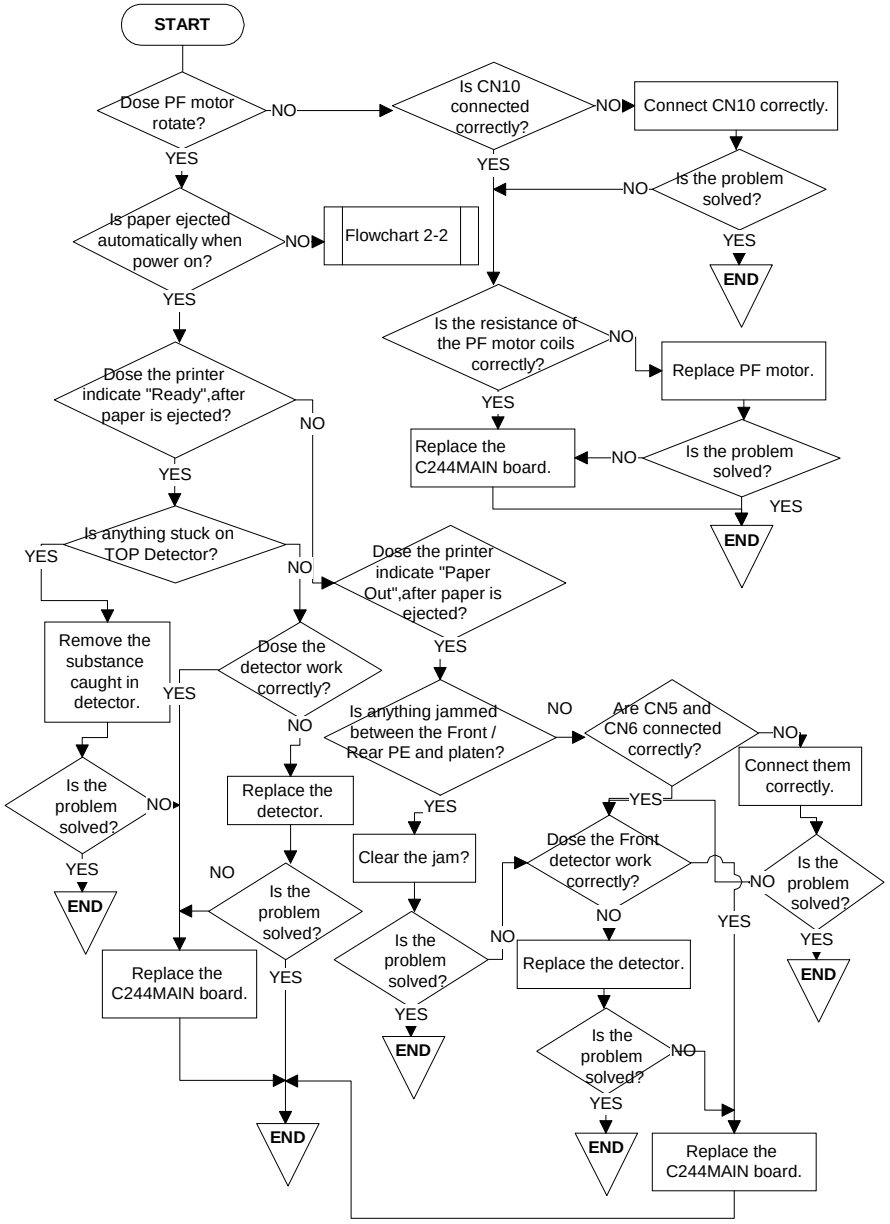


Figure 3-4. Flowchart 2 - 1

2. Abnormal Paper Feed Operation - 2

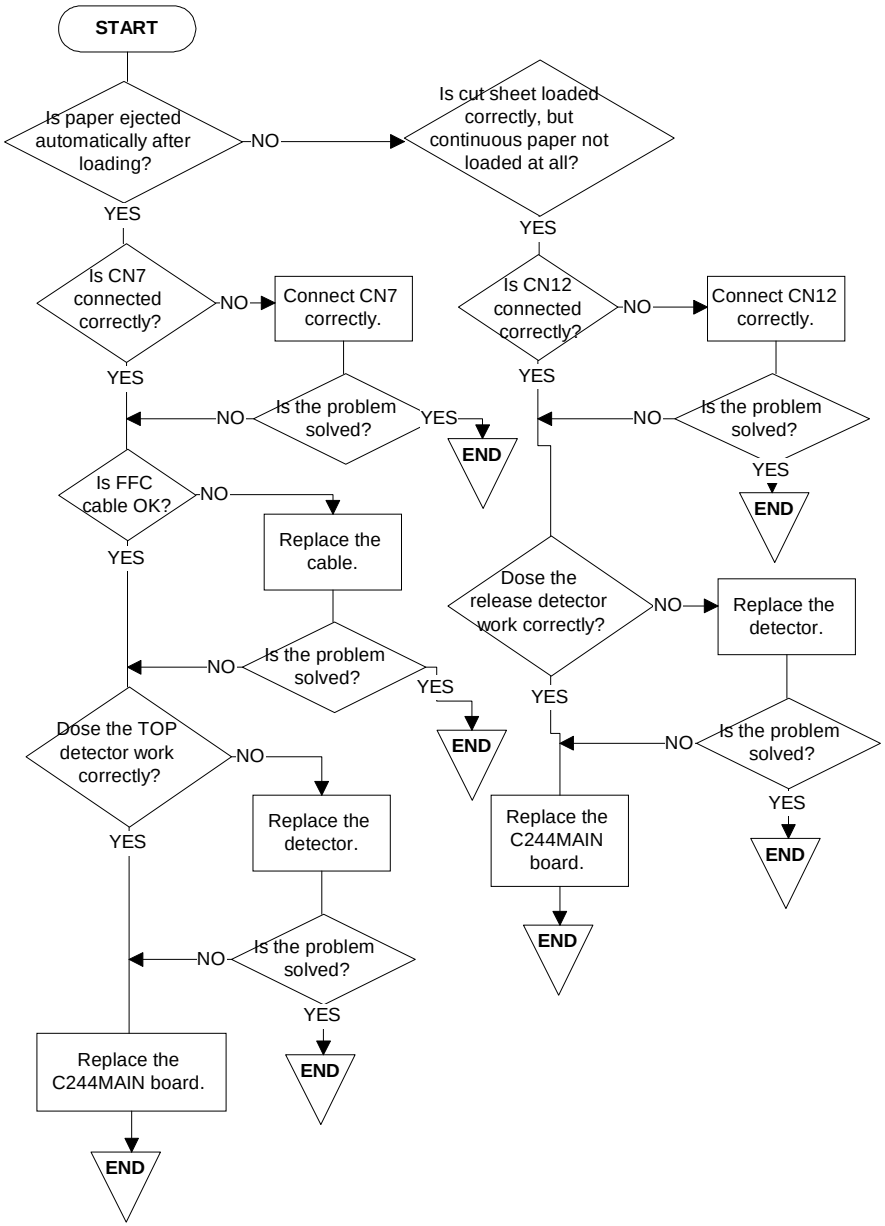


Figure 3-5. Flowchart 2 - 2

3. Abnormal Control Panel Operation

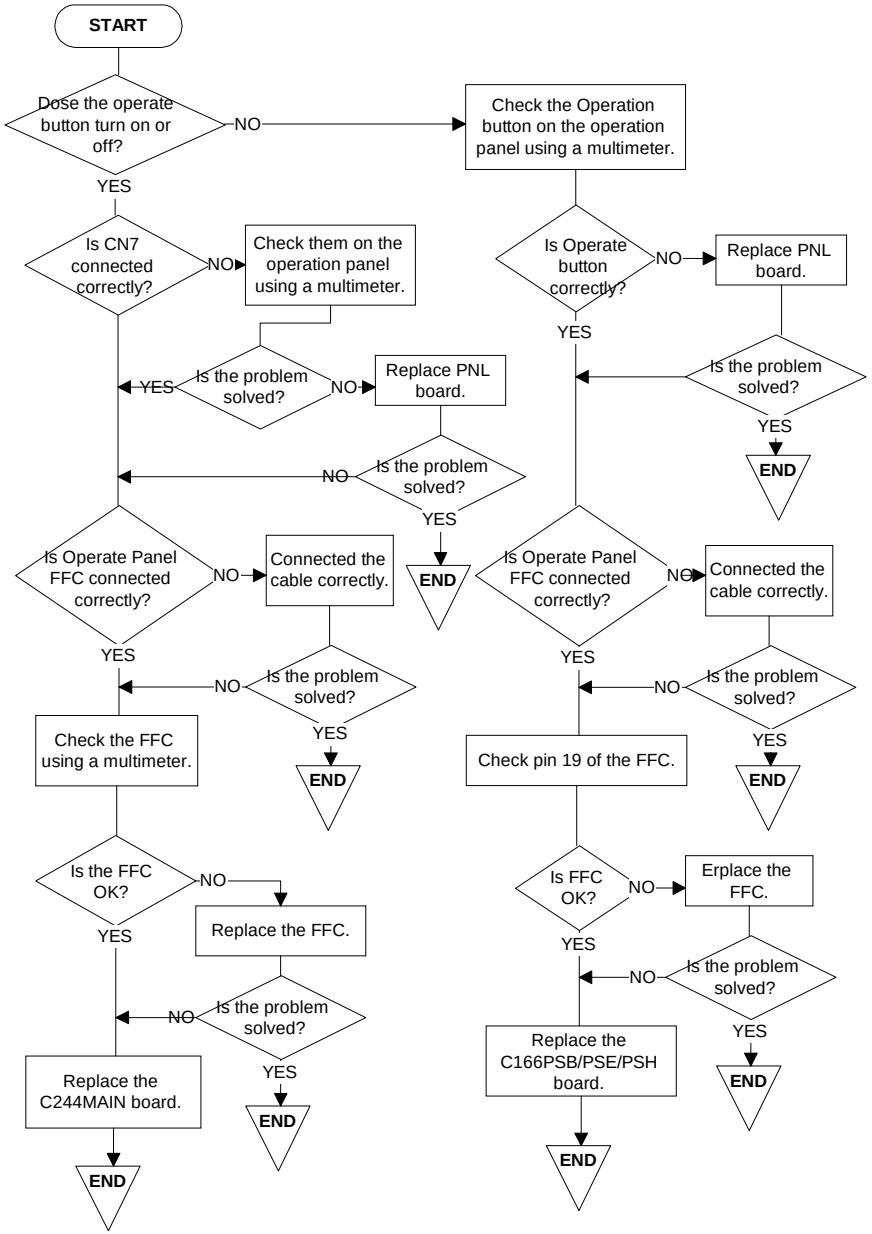


Figure 3-6. Flowchart 3

4. Abnormal Printing

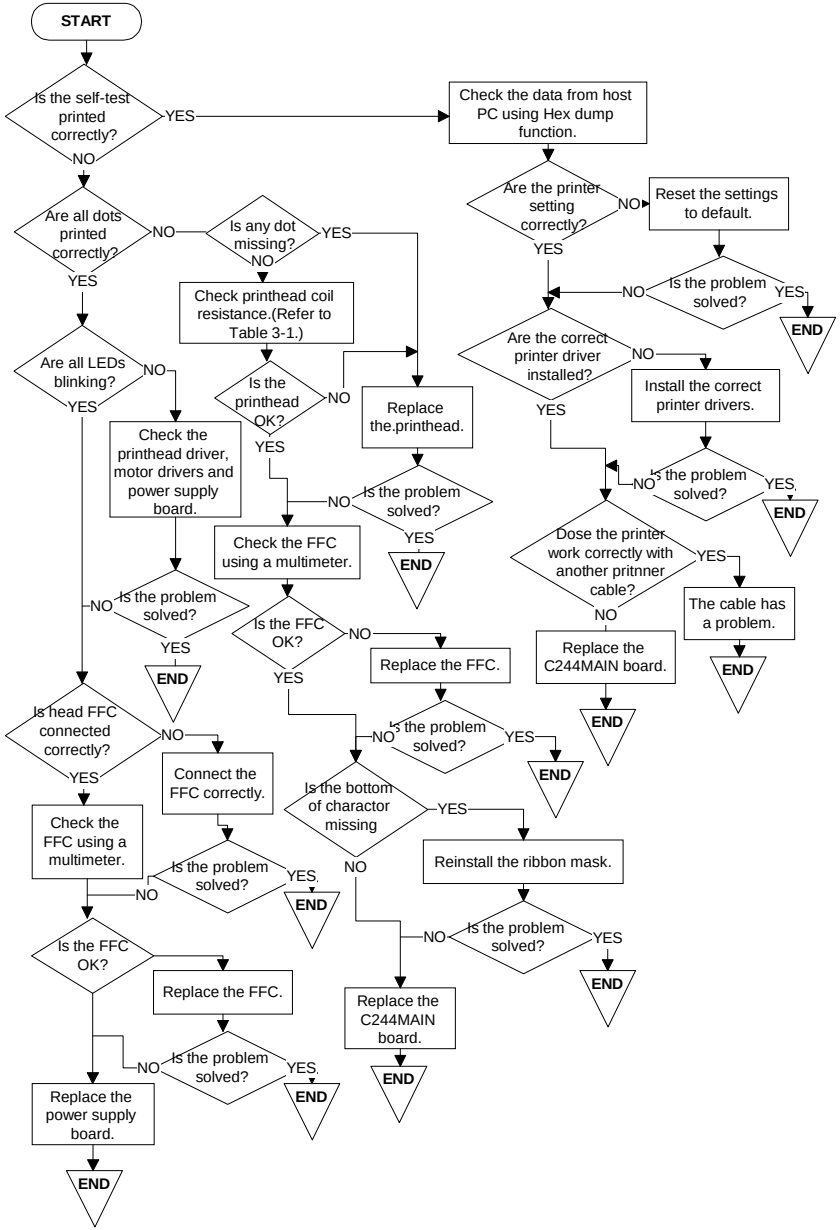


Figure 3-7. Flowchart 4

3.4 REPAIRING THE POWER SUPPLY BOARD

This section provides instructions for repairing a defective power supply board assembly. It describes various symptoms, likely causes and checkpoints. Refer to proper waveforms, resistance and other values shown in the tables when evaluating the operation of any potentially faulty component. Check these value and take the appropriate action.

⚠WARNING

The* OPERATE *switch on the operation panel only turns the secondary power circuit on or off, so the primary circuit is live as long as the printer is connected to AC power outlet. Before, you repair or touch the power supply board, be sure to disconnect the AC power outlet.

⚠CAUTION

This information is necessary only for servicers who repair to the component level. Servicers who repair to the unit level (including all servicers in the U.S.) can ignore this section.

Table 3-7. Repairing the Power Supply Board

Problem	Cause	Checkpoint	Solution
+35V and +5V lines are not output when the printer is power on.	The diode bridge DB1 is failure.	Measure the DC voltage between the pin 3 and 4 of DB1.	Replace DB1.
	The transformer T1 coil is open.	Measure the resistance of T1 coils at pin 12 - 15, 9 - 11, 7 - 8 or 3 - 4.	Replace T1.

Table 3-8. Repairing the Power Supply Board (Continued.)

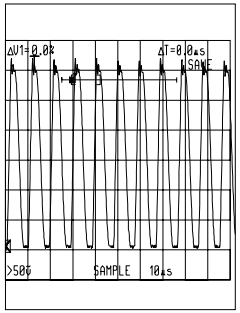
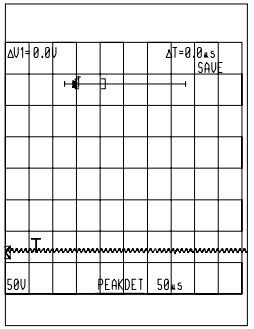
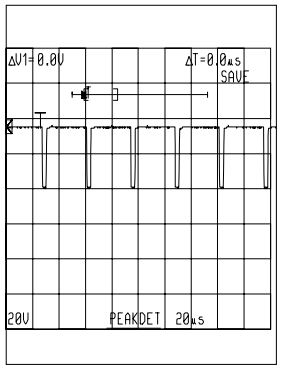
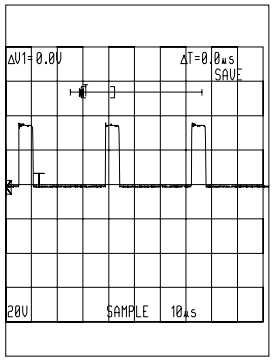
Problem	Cause	Checkpoint	Solution
+35V and +5V lines are not output when the printer is power on.	Switching FET Q1 is failure.	•Check the resistance between SOURCE and DRAIN is infinite. •Check the voltage waveform between SOURCE and DRAIN of Q1.  **Figure 3-8. Waveform 1**	Replace Q1.
	PC1 is failure.	Check the waveform between pin 3 and 4.  **Figure 3-9. Waveform 2**	Replace PC1.
	Q32 is failure.	Check that the resistance between COLLECTOR and EMITTER is infinite.	Replace Q32.
	Q31 is failure.	Check that resistance between SOURCE and DRAIN is infinite.	Replace Q31.

Table 3-9. Repairing the Power Supply Board (Continued.)

Problem	Cause	Checkpoint	Solution
+5V lines is not output.	Chopper IC IC51 is failure.	Check the waveform at pin 8 of IC51.  **Figure 3-10. Waveform 3**	Replace IC51.
Q51 is failure.		Check the waveform at COLLECTOR of Q51.  **Figure 3-11. Waveform 4**	Replace Q51.
L51 is failure.		Check the resistance between terminals of L51.	Replace L51.
The PWDN signal is constantly HIGH.	IC51 is failure.	Check whether the voltage of pin 6 is more than 1.3V or not. If the voltage is more than 1.3V, IC51 is failure.	Replace IC51.

3.5 REPAIRING C244 MAIN BOARD ASSEMBLY

This section provides instructions for repairing C244 MAIN board assembly. It describes various problem, symptoms, likely cases and solutions. The check points columns provide proper waveforms, resistance values and other information for each component of C244 MAIN.

⚠CAUTION

This information is necessary only for servicers who repair to the component level. Servicers who repair to the unit level (including all servicers in the U.S.) can ignore this section.

Table 3-10. Repairing C244 MAIN Board Assembly

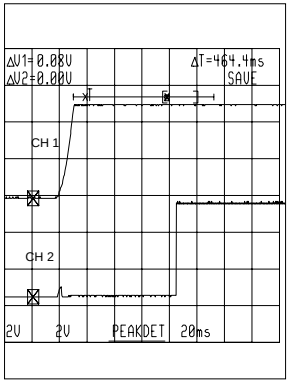
Problem	Cause	Checkpoint	Solution
The printer dose not operate at all.	Reset IC15 is defective.	Check the voltage waveforms of the VCC signal (CH1 : IC15 pin 7) and /RESET signal (CH2 : IC15 pin 5) when the printer is turned on.  **Figure 3-12. Waveform 5**	Replace the main board or IC15.

Table 3-11. Repairing C244 MAIN Board Assembly (Continued.)

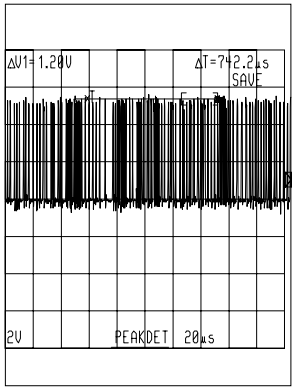
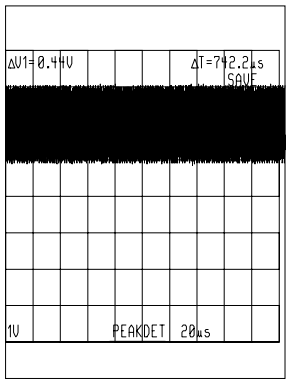
Problem	Cause	Checkpoint	Solution
The printer dose not operate at all.	The PROM (IC5) is not selected.	Check the signal for a change in HIGH and LOW at pin 137 of IC1.  **Figure 3-13. Waveform 6**	Replace the main board.
	The PSRAM (IC3) is not selected.	Check the signal for a change in HIGH and LOW at pin 132 of IC1.	Replace the main board.
	CPU (IC2) is defective.	Check the oscillator signal at pins 26 or 27 of the CPU  **Figure 3-14. Waveform 6**	Replace the main board.

Table 3-12. Repairing C244 MAIN Board Assembly (Continued.)

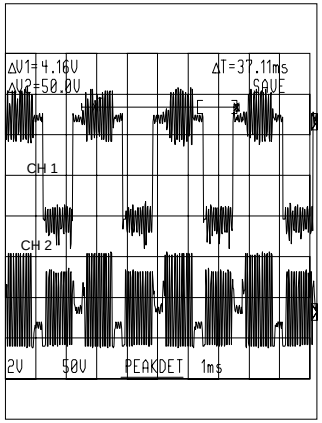
Problem	Cause	Checkpoint	Solution
The carriage operation is abnormal.	CPU or IC9 is defective.	•Check the input signal waveforms (CH 1) at pins 5, 6, 16 and 17 of IC9. •Check the output signal waveforms (CH 2) at pins 1, 8, 11 and 18 of IC9.  **Figure 3-15. Waveform 7**	•If the input signal is not correct, replace the main board. •If the output signal is not correct, replace IC9 or replace the main board.
	IC1 is defective	Check the output signals at pins 62, 63, 64 and 65 of the IC1.	If the output signal is not correct, replace the main board.

Table 3-13. Repairing C244 MAIN Board Assembly (Continued.)

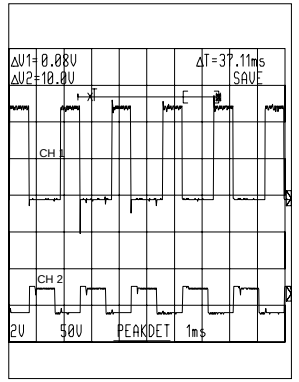
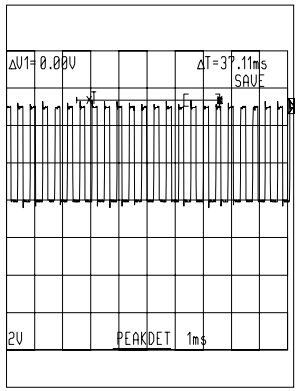
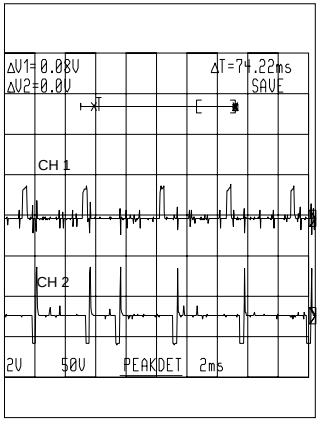
Problem	Cause	Checkpoint	Solution
Paper feed is abnormal.	IC1, IC2 or IC12 is defective.	•Check the input signal waveforms (CH 1) at pins 26 and 43 of IC12. •Check the output signal waveforms (CH 2) at pins 3, 6, 18 and 21 of IC12.  **Figure 3-16. Waveform 7**	•If the input signal is not correct, replace the main board. •If the output signal is not correct, replace IC12 or replace the main board.
No data is printed.	CPU is defective.	Check the output signal waveforms at pins 15 or 19 of IC2.  **Figure 3-17. Waveform 8**	If the output signal is not correct, replace the main board.

Table 3-14. Repairing C244 MAIN Board Assembly (Continued.)

Problem	Cause	Checkpoint	Solution
A particular dot fails to print.	IC1 or head drive transistor (Q2 ~ Q19) is defective.	• Check the input signal waveform (CH 1) at BASE of each transistor. • Check the output signal waveform (CH 2) at COLLECTOR of each transistor.  **Figure 3-18. Waveform 9**	• If the input signal is not correct, replace the main board. • If the output signal is not correct, replace the transistor or the main board.

3.6 REPAIRING THE PRINTER MECHANISM

This section provides instructions for repairing the printer mechanism. It describes various symptoms, likely causes, checkpoints and solutions. The checkpoint columns show items to be checked, including proper values to be set for each component of the printer mechanism. For replacement and adjustment instructions, see Chapter 4 Disassembly and Assembly, and Chapter 5 Adjustment. If the same symptom appears after repair, select another item in the list of the causes and repair the printer according to the instructions.

Table 3-15. Repairing the Printer Mechanism

Problem	Symptom	Cause	Checkpoint	Solution
CR operation is abnormal.	CR motor dose not rotate at all when the printer is turned on.	CR motor is defective.	Measure the coil resistance of the motor: Approx. 2.7Ω (Refer to Table 3-1.)	Replace CR motor.
	CR motor dose not rotate at all and LEDs blink when the printer is turned on.	CN11 is disconnected from the main board.	Check CN11.	Connect CN11 correctly.
	CR motor rotates when the printer is turned on. But the CR unit dose not move.	The timing belt comes off from the pinion of CR motor.	Check the timing belt.	Replace the timing belt.
	CR unit moves slightly and then stops.	Platen gap is too narrow.	Check CR unit by moving it smoothly by hand.	Confirm the platen gap. Adjust platen gap if narrow.

Table 3-16. Repairing the Printer Mechanism (Continued.)

Problem	Symptom	Cause	Checkpoint	Solution
CR operation is abnormal.	CR unit moves slightly and then stops.	Lack of lubrication or foreign object lodged in the printer.	– Move the CR unit manually to check if it moves smoothly – Check CR shaft or oil pad for their condition; dried up or not.	Replace the oil pad or lubricate CR shaft. Remove it and clean the shaft, and lubricate it.
		HP detector is detective.	Check HP detector. (Refer to Table 3-2.)	Replace HP detector.
		A foreign object is lodged in HP detector.	Check the Hp detector.	Remove any foreign object.
		CN4 is disconnected from Hp detector.	Check the connection.	Connect CN4 correctly.
	CR motor moves left (HP side) and strikes the frame in the printer.	HP detector is failure.	Check HP detector. (Refer to Table 3-2.)	Replace HP detector.

Table 3-17. Repairing the Printer Mechanism (Continued.)

Problem	Symptom	Cause	Checkpoint	Solution
Printer is abnormal.	No image is printed.	Common wires in the printhead FFC are disconnected or there is no continuity.	Check the common wires in the printhead FFC.	Replace the printhead FFC.
	The printer does not print particular dots.	The printhead is defective.	Measure the coil resistance of the printhead : Approx. 16.4Ω (Refer to Table 3-1.)	Replace the printhead.
		Common wires in the printhead FFC are disconnected or there is no continuity.	Check the FFC for continuity.	Replace the FFC.
	Printing is uneven on the both edges of the column.	Platen parallelism is not adjusted properly.	Check the platen parallelism. (Refer to Chapter 5.)	Adjust platen parallelism .
	The printing result is too light.	The printhead is failure.	Check if the tip of the dot wire is worn.	Replace the printhead.
		The platen gap is too wide.	Check the platen gap. (Refer to Chapter 5.)	Adjust platen gap properly.

Table 3-18. Repairing the Printer Mechanism (Continued.)

Problem	Symptom	Cause	Checkpoint	Solution
Paper feed is abnormal.	PF motor dose not rotate at all.	PF motor is defective.	Measure the coil resistance of PF motor : Approx. 16.1Ω (Refer to Table 3-4.)	Replace PF motor.
		CN10 is disconnected from the main board.	Check CN10.	Connect CN10 correctly.
		Rear or Front PE detector is defective.	Check rear or front detector. (Refer to Table 3-2,Table 3-2)	Replace the detector.
		Rear or Front PE detector is not mounted correctly.	Check the mounting position.	Mount the detector into proper position.
	The printer only ejects paper automatically when it is turned on, and enters READY status.	A foreign object is sticking to TOP detector.	Check TOP detector.	Remove it if the object is sticking.
		TOP detector is defective.	Check TOP detector. (Refer to Table 3-2.)	Replace TOP detector.

Table 3-19. Repairing the Printer Mechanism (Continued.)

Problem	Symptom	Cause	Checkpoint	Solution
Paper feed is abnormal.	Paper is only ejected automatically at power-on, and the paper end error occurs.	A foreign object is lodged between detector and platen.	Once remove the platen, and check the platen.	Remove any foreign object.
	Paper is only ejected automatically at power-on, and the paper end error occurs.	CN5 or CN6 is disconnected.	Check the connection.	Connect CN5/CN6 correctly.
		Rear or Front PE detector is failure.	Check rear or front detector. (Refer to Table 3-2,Table 3-2)	Replace the detector.
	Paper is loaded, but ejected automatically. .	TOP detector's FFC (CN7) is disconnected.	Check the connection.	Connect it correctly.
		The FFC is defective.	Check the FFC's continuity using a multimeter.	Replace the FFC.
		TOP detector is defective.	Check TOP detector. (Refer to Table 3-2.)	Replace TOP detector.

Table 3-20. Repairing the Printer Mechanism (Continued.)

Problem	Symptom	Cause	Checkpoint	Solution
Paper feed is abnormal.	Cut sheet paper is loaded correctly, but continuous paper is not loaded at all.	CN12 is not connected correctly.	Check the connection.	Connect CN12 correctly.
		Release detector is defective.	Check the release detector. (Refer to Table 3-3.)	Replace the release detector.
Ribbon feed is abnormal.	Ribbon is not fed.	The ribbon cartridge is defective.	Remove the cartridge, and turn the ribbon feed knob by hand to check if the ribbon is fed normally.	Replace the ribbon cartridge.
		Foreign object is caught in the gears.	Check the ribbon driving gears.	Remove the foreign object or replace the cartridge.
	The ribbon feeds properly only when the carriage moves in one direction.	The ribbon driving gears are defective.	Check the gears by moving the carriage unit by hand.	Replace the ribbon driving mechanism.

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 OVERVIEW

This section describes various points to note when disassembling and assembling the printer.

4.1.1 Precaution

Following the precautions below for disassembly or assembly.

⚠WARNING

- ***Before disassembling, assembling, or adjusting the printer, disconnect the power supply cable from the AC power socket. Failure to do so can cause physical injury.***
- ***The power switch is wired in the secondary circuitry. Therefore, the printer's primary circuitry remains live even after the power switch is turned off.***
- ***Never touch primary parts of the power supply unit (including the heat sink) while the power supply cable is connected to the AC power socket.***

⚠CAUTION

To maintain efficient printer operation:

- ***Use only recommended tools for maintenance work.***
- ***Use only recommended lubricants and adhesives. (Refer to Chapter 6.)***
- ***Adjust the printer only in the manner described in this manual.***

4.1.2 Tools

The following tables list the tools recommended for disassembling, assembling, or adjusting the printer. Use only tools that meet these specifications.

Table 4-1. Recommended Tools

Tool	Part No.
Round-nose pliers	B740400100
Nippers	B740500100
Tweezers	B741000100
Soldering iron	B740200100
E-ring holder #2.5	B740800400
Phillips screwdriver No.2	B743800200
Standard screwdriver	B743000100
Thickness gauge	B776702201

Note: All tools are commercially available.

Table 4-2. Equipment Required for Maintenance

Description	Specification
Multimeter	—
Oscilloscope	50MHz

Note: An oscilloscope is required only for servicers who repair to the component level.

4.1.3 Service Check After Repair

Before returning the printer after service, use the check list in the following table, which provides a record to make servicing and shipping more efficient.

Table 4-3. Inspection Check List for the Repaired Printer (1)

Category	Components	Item	Check
Printer unit	Printhead	Is any wire broken?	Checked Not necessary
		Is any wire worn out?	Checked Not necessary
	Carriage mechanism	Dose the carriage move smoothly? Movement noisy Mechanism dirty Mechanism oily	Checked Not necessary
		Is the CR motor at the correct temperature (not overheating)?	Checked Not necessary
	Paper advance mechanism	Is paper advancing smoothly? Movement noisy Mechanism dirty Mechanism oily	Checked Not necessary
		Is the paper feed motor running at the correct temperature (not overheating)?	Checked Not necessary
	Paper Path	Is the type of paper in the printer feeding smoothly?	Checked Not necessary
		Is the tractor feeding paper correctly?	Checked Not necessary
		Is the paper path clear of all obstructions?	Checked Not necessary
		Is the platen free of damage?	Checked Not necessary

Table 4-4. Inspection Check List for the Repaired Printer (2)

Category	Components	Item	Check
Printer unit	Ribbon mask	Is the ribbon mask free of distortion?	Checked Not necessary
	Self-test printing	Is the self-test printing performed correctly?	Checked Not necessary
	On-line test printing	Is the on-line printing performed correctly?	Checked Not necessary
Adjustment	Printhead printing	Is the platen gap adjusted correctly?	Checked Not necessary
		Is Bi-directional print position adjusted correctly?	Checked Not necessary
	Default settings	Have user-changeable settings been reset to the default settings?	Checked Not necessary
System upgrade	ROM version	ROM version _____.	Checked Not necessary
	Shipment	Has the ribbon been removed?	Checked Not necessary
		Have all relevant parts been included in the shipment?	Checked Not necessary

4.1.4 Specifications for Screws

The following table lists the abbreviations used in the following sections for small parts, such as screws and washers, etc.

Table 4-5. Screw types and Abbreviations

Abbreviation	Part name
CPS	Cross-recessed pan head S-tight screw
CBB	Cross-recessed bind head B-tight screw
CBS	Cross-recessed bind head S-tight screw
CBN	Cross-recessed bind head N-tight screw
CBC	Cross-recessed bind head C-lamitite screw
CBA	Cross-recessed bind head A-lamitite screw
CB(O)	Cross-recessed bind head with outside-toothed lock washer

Table 4-6. Screw types

Head		Body
Top	Side	
Cross-recessed head	Pan Bind (with Notch)	S-tight Normal B-tight C-lamitite A-lamitite

4.2 DISASSEMBLY AND ASSEMBLY

This section describes procedures for disassembling and assembling the main components of the printer. When the procedure for installing a components is simply the reverse of removing the component, this chapter dose not describe the assembly procedure. If necessary, special notes on assembling or adjusting a component are given at the end of description of each procedure. Be sure to follow the instructions in these notes. Exploded diagrams in the Appendix shows how the components fit together. Refer to them as necessary.

⚠CAUTION

- ***Before disassembling any part of the printer, note the warnings in Section 3.1.***
- ***Before beginning to disassemble the printer, remove the paper , ink ribbon, relevant parts, etc.***
- ***Whenever the printer is repaired, wipe the surface of the paper width (PW) sensor assembly with a soft cloth, and keep it clean to avoid abnormal operation. If the surface is dirty from any adhering material, sensor sensitivity goes down and operation is not correct.***

The flowchart below shows the order to disassemble the printer.

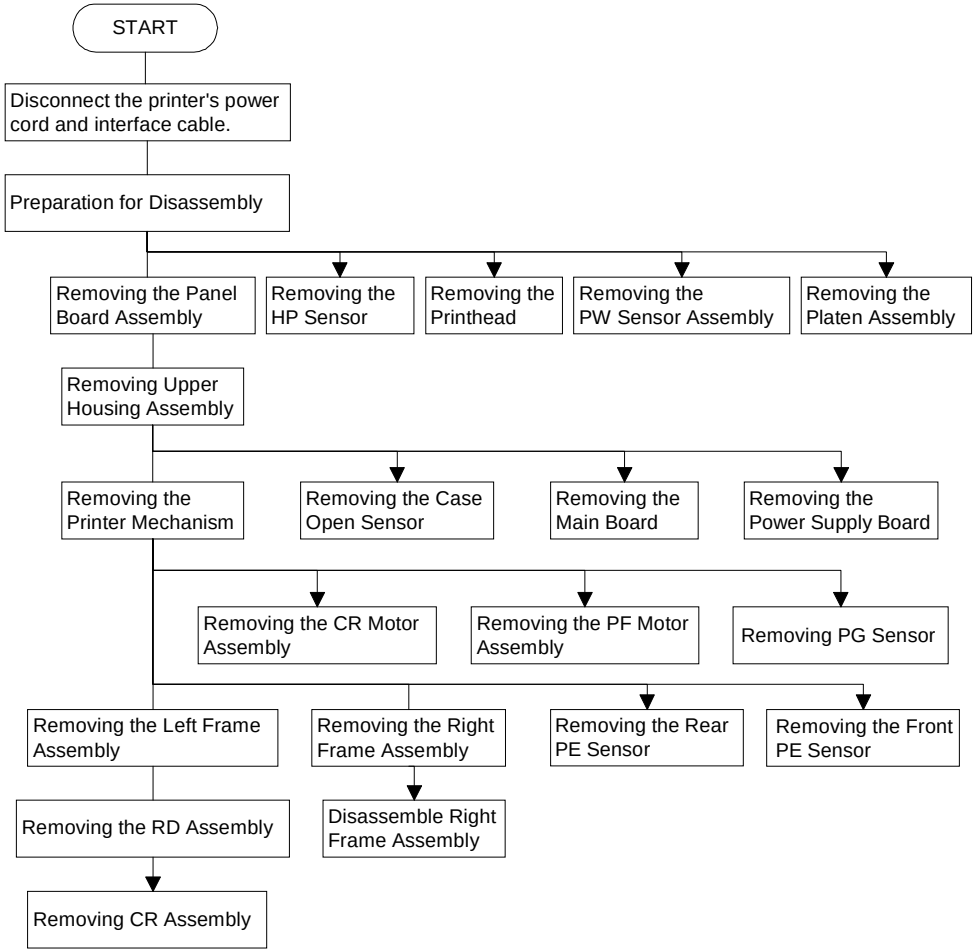

START
Disconnect the printer's power cord and interface cable.
Preparation for Disassembly
Removing the Panel Board Assembly
Removing the HP Sensor
Removing the Printhead
Removing the PW Sensor Assembly
Removing the Platen Assembly
Removing Upper Housing Assembly
Removing the Printer Mechanism
Removing the Case Open Sensor
Removing the Main Board
Removing the Power Supply Board
Removing the CR Motor Assembly
Removing the PF Motor Assembly
Removing PG Sensor
Removing the Left Frame Assembly
Removing the Right Frame Assembly
Removing the Rear PE Sensor
Removing the Front PE Sensor
Removing the RD Assembly
Disassemble Right Frame Assembly
Removing CR Assembly

Figure 4-1. Flowchart for Disassembling the Printer

4.2.1 Preparation for Disassembly the Printer

1. Remove the following belonging parts from the printer:
   Front edge guide assembly, Front cover, Bottom cover,
   Rear edge guide assembly, Printer cover, Paper eject assembly,
   Front / rear tractor assembly, Ribbon cartridge

⚠CAUTION

Remove the paper eject cover and the front / rear tractor assembly by pushing to release the hooks at both sides. When remount them, be sure the hooks on the projecting parts.

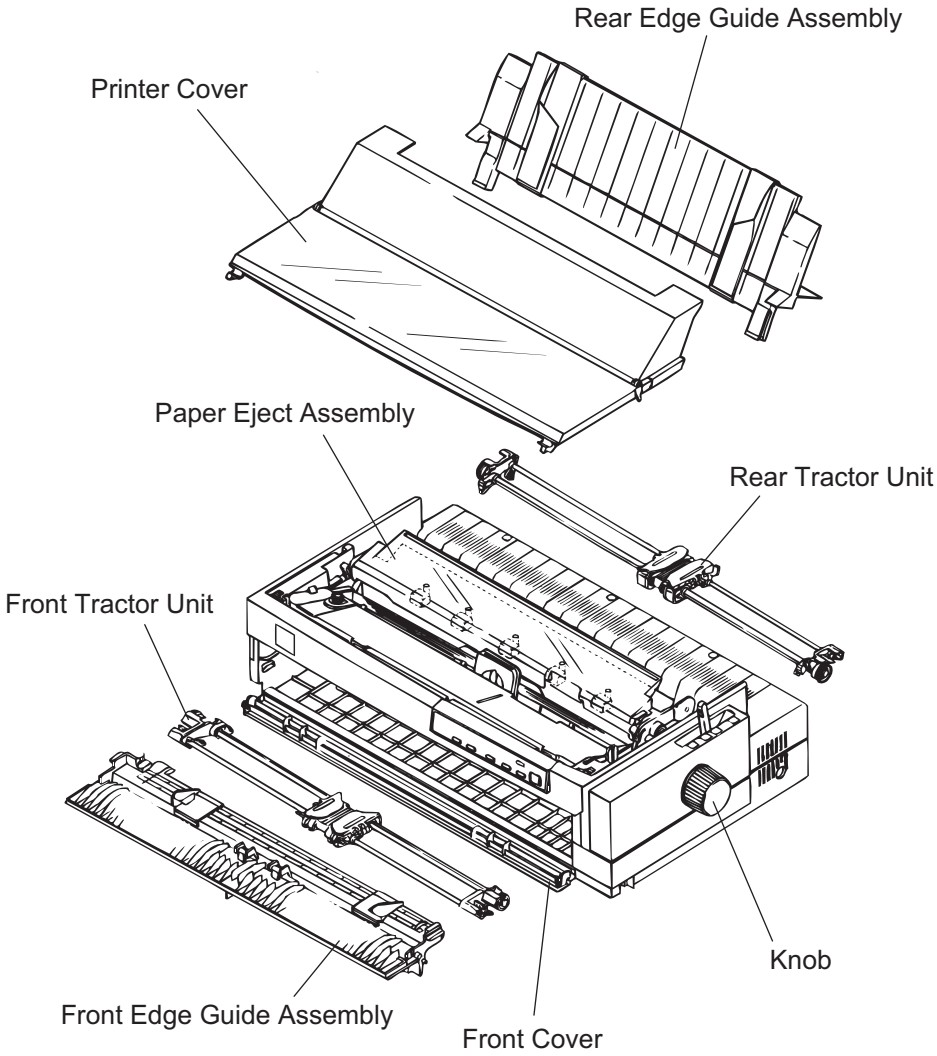


Figure 4-2. Belonging parts Disassembly

4.2.2 Removing the Panel Board Assembly

1. Remove the printer cover and ribbon cartridge. (Refer to Section 4.2.1.)
2. Release the left clips for the panel board assembly by pushing them from the cutout located on side front of the upper housing assembly.
3. Release FFC (flexible flat cable) by pulling the lock cover for CN1, and then disconnect the FFC for CN1 and connector CN2 from the C165 PNL board assembly.
4. Remove the panel board assembly from the upper housing assembly.

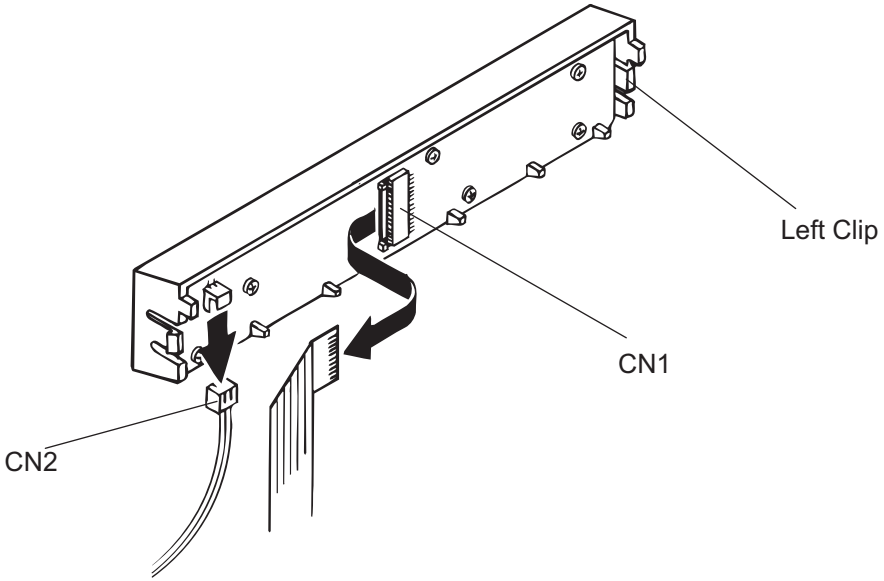


Figure 4-3. Remove the Panel Board Assembly

✓CHECK POINT

- ***Before disconnecting the FFC from CN1, slide the lock cover for CN1 as shown in Figure 4-4, and release the FFC from CN1. After reconnecting the FFC for CN1, lock the lock cover.***
- ***The FFC must be connected properly, as shown in following figure. Exposed terminals must be connected face upward against the C165 PNL board.***

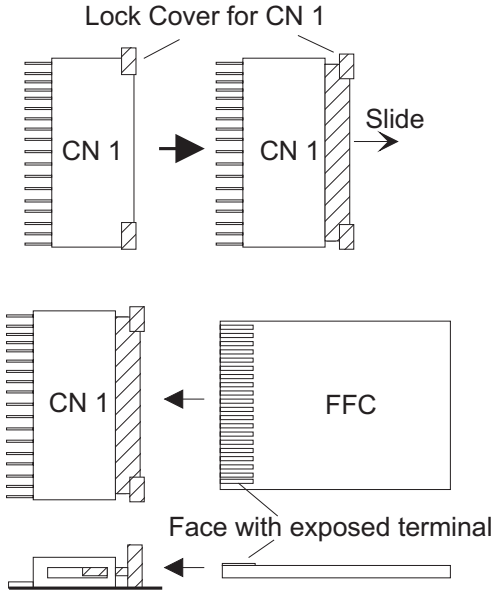


Figure 4-4. Lock Cover for CN1 and FFC

4.2.3 Removing the Printhead

1. Remove the printer cover and ribbon cartridge. (Refer to Section 4.2.1.)
2. Remove two CBS screws (3 × 10)securing the printhead to the CR assembly.
3. Remove the printhead from the CR assembly.
4. Disconnect two wide FFCs from the printhead and then disconnect the narrow FFC from the connector on the CR cover.

✓CHECK POINT

- ***The FFC must be connected properly, as shown in the following figure.***
- ***The tightening torque for the screws : 0.59 ~ 0.78 Nm (6 ~ 8 Kgf-cm)***

ADJUSTMENT ▶

Adjust the platen gap. (Refer to Chapter 5.)

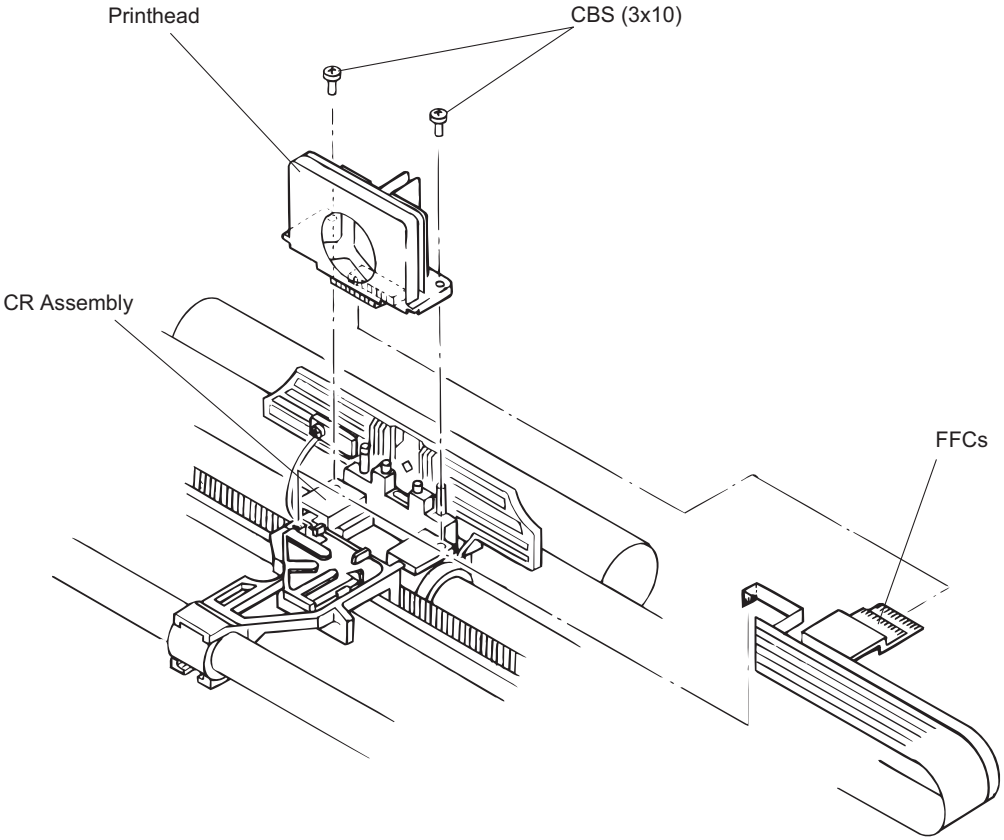


Figure 4-5. Removing the Printhead

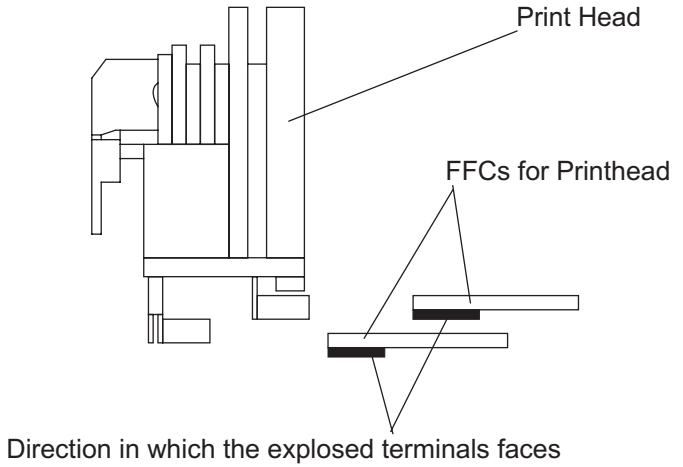


Figure 4-6. Method for Connecting the Printhead FFC

4.2.4 Removing the HP Sensor

1. Remove the printer cover, ribbon cartridge, front edge guide and front cover. (Refer to Section 4.2.1.)
2. Disconnect the connector cable for the HP sensor.
3. Remove the HP sensor by pushing up and releasing the 2 clips at the bottom of the HP sensor from the front paper entrance.

✓CHECK POINT

Notice the direction for mounting the HP sensor. Refer to the following figure.

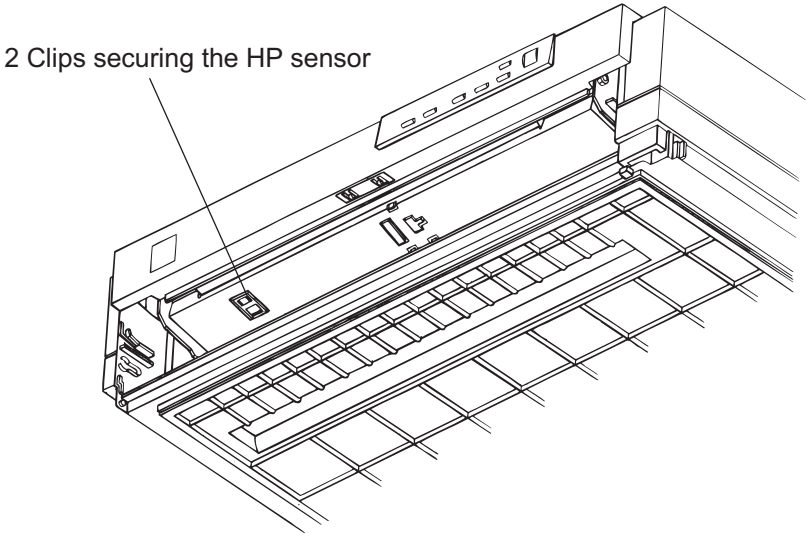


Figure 4-7. Removing the HP Sensor

4.2.5 Removing the PW Sensor Assembly

1. Remove the printer cover and ribbon cartridge. (Refer to Section 4.2.1.)
2. Remove the CB screw (2.5×5) securing the PW sensor to the ribbon mask holder.
3. Release three clips of CR cover securing it to CR assembly from the bottom of CR Assembly, and pick up the cover a little.
4. Remove the FFC from the PW sensor connector, mounted onto the CR cover.
5. Remove the PW sensor assembly along with the CR cover by pushing and releasing a clip for the CR cover, as shown in the following figure.

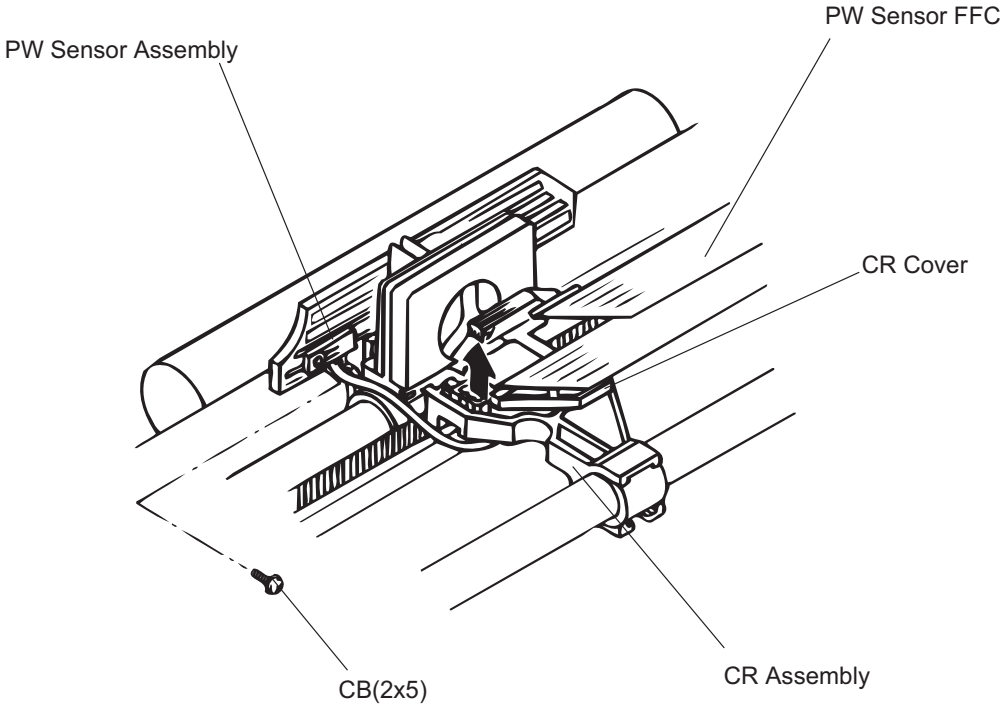


Figure 4-8. Removing the PW Sensor Assembly

ADJUSTMENT ***Replacing the PW sensor assembly, reset the TPE level. (Refer to Chapter 5.)***

✓CHECK POINT

- ***Mount the PW sensor assembly onto the ribbon mask holder groove, aligning the bottom line of micro photo sensor to the bottom line of the groove.***
- ***Whenever you remove the PW sensor assembly, clean the surface of the sensor by wiping it with a soft material. If the surface is not clear, abnormal operations may occur, such as printing on the platen surface.***
- ***The tightening torque for the CB screw(2.5×5) : 0.08 ~ 0.12 Nm (0.8 ~ 0.12 Kgf-cm)***

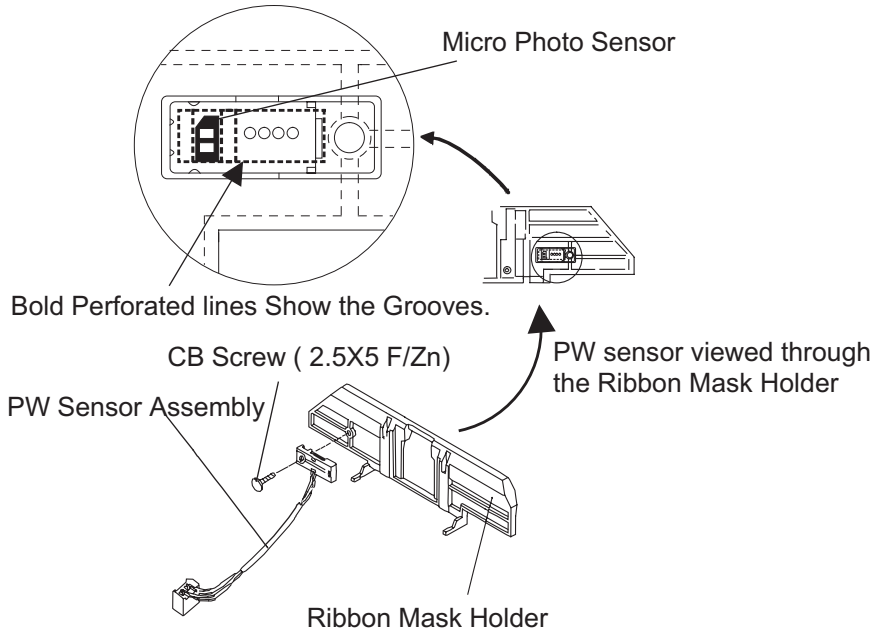

Micro Photo Sensor
Bold Perforated lines Show the Grooves.
CB Screw (2.5X5 F/Zn)
PW sensor viewed through
the Ribbon Mask Holder
PW Sensor Assembly
Ribbon Mask Holder

Figure 4-9. Mounting Position for the PW Sensor Assembly

4.2.6 Removing the Platen Assembly

1. Remove the printer cover, ribbon cartridge and platen knob. (Refer to Section 4.2.1.)
2. Set the release lever to pull tractor feed mode.
3. Release both locks for the left and right bushing (8mm) by pushing the lever holder for the bushings outside, and then pulling the holder lever forward.

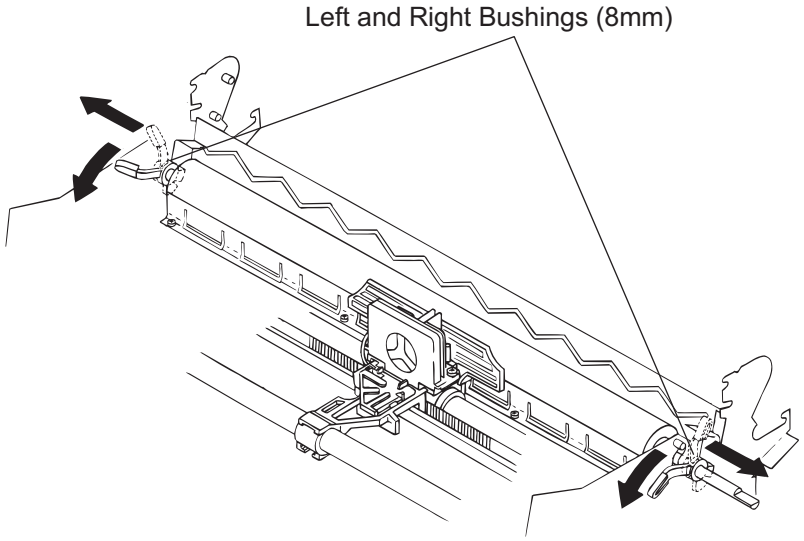


Figure 4-10. Releasing the Locks for the Bushings

4. Slide the platen assembly to the right, and move the printhead to the right edge.
5. Pull the left edge of the platen assembly upward by tilting it backward, and then pull up the right edge of the platen assembly.

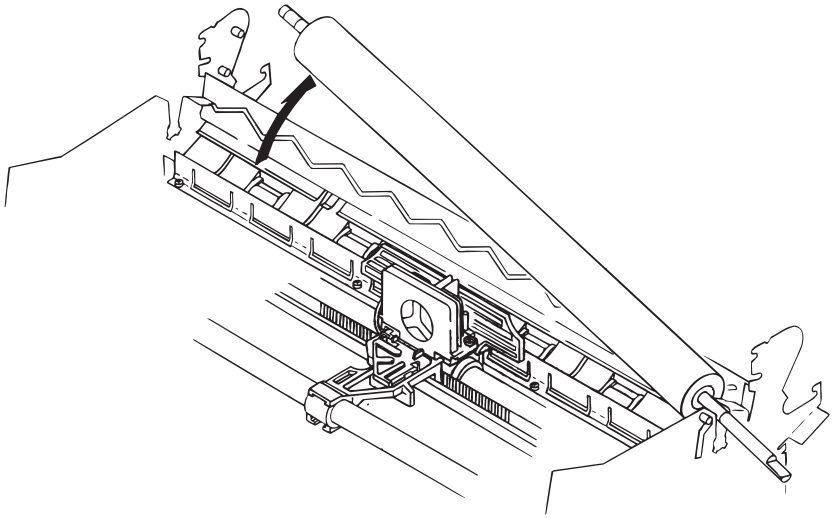


Figure 4-11. Removing the platen Assembly

✓CHECK POINT

- ***Before installing the platen assembly into the printer mechanism, move the printhead to the right edge of the CR shaft, and set the release lever to the tractor position. This pre-assembly operation helps you mount the platen assembly more easily.***
- ***After installing the platen assembly into the printer mechanism, make sure both locks for left and right bushings (8mm) are locked completely.***
- ***Be careful handling the lever holders for the left and right bushings (8mm). These are fragile.***

ADJUSTMENT ▶

Adjust the platen gap. (Refer to chapter 5.)

4.2.7 Removing the Upper Housing Assembly

1. Remove the printer cover, rear edge guide assembly paper eject assembly and rear tractor unit. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove four CBB screws (4 × 4) securing the upper housing assembly.
4. Remove the platen knob.
5. Lift up the front side of the housing assembly by releasing 2 hooks from the holes locates on the right and left of the front bottom side.

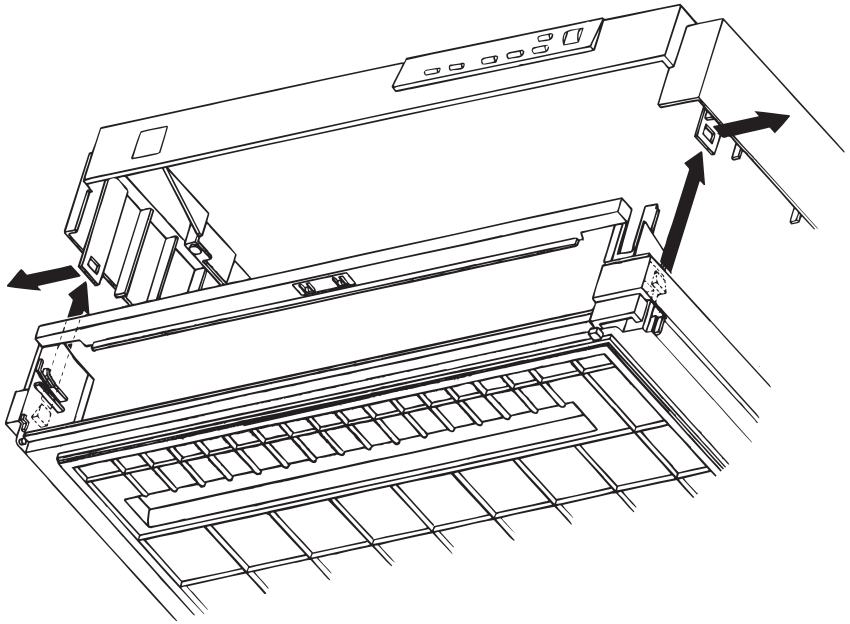


Figure 4-12. Releasing the Upper Housing Assembly Hooks

6. Remove the upper housing assembly.

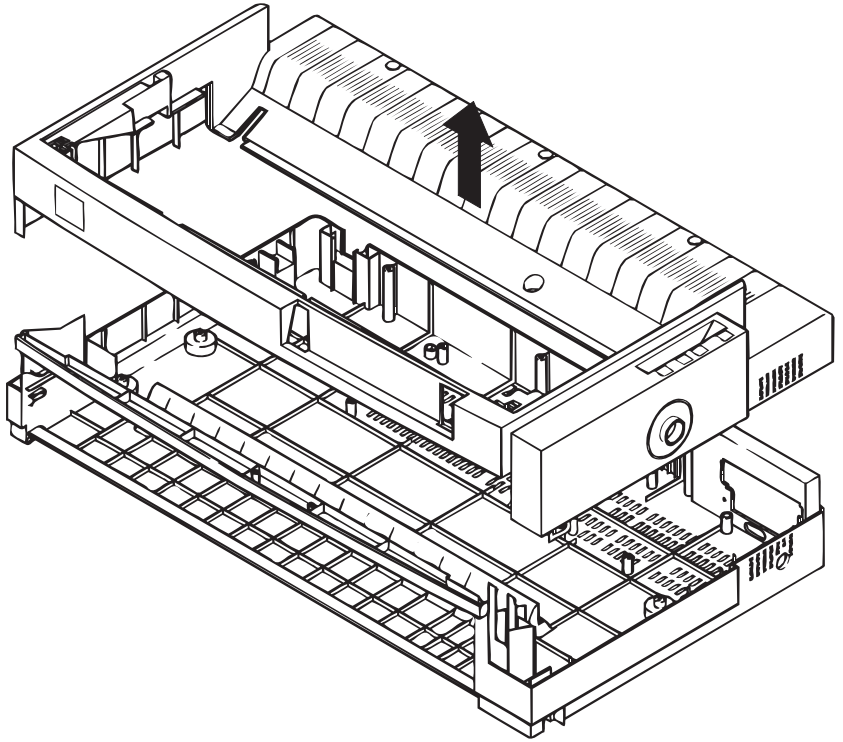


Figure 4-13. Removing the Upper Housing Assembly

✓CHECK POINT

The tightening torque for the CBB screw : 0.98 ~ 1.22 Nm (10 ~ 12 Kgf-cm)

4.2.8 Removing the Case Open Sensor Assembly

1. Remove the printer cover, rear edge guide assembly, paper eject assembly and rear tractor unit. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Turn the upper housing assembly over and remove the case open sensor assembly by loosening one CBB screw (3 × 8) securing the sensor holder to the upper housing assembly.

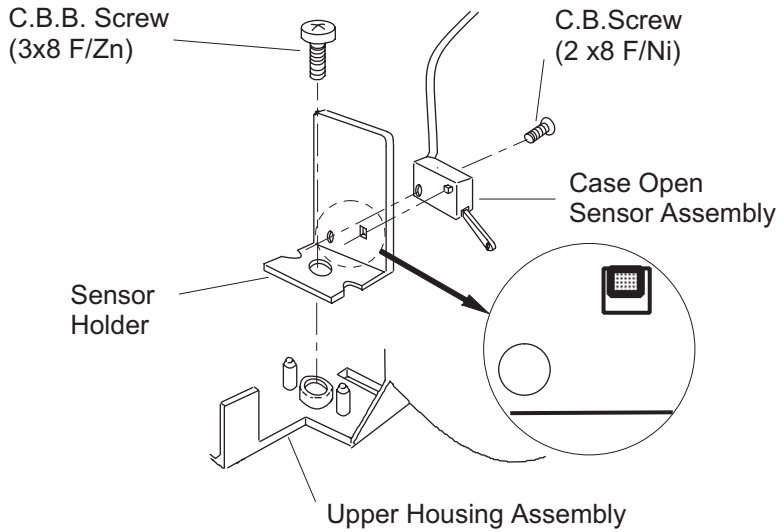


Figure 4-14. Removing the Case Open Sensor Assembly

4.2.9 Removing the Printer Mechanism

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear tractor unit. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove three CBS screws (3 × 4) securing the upper shield plate to the printer mechanism and the upper I/F grounding plate on the main board assembly.
5. Remove four printer mechanism mounting screws securing the printer mechanism.
6. Disconnect the following connectors on the main board assembly.

Table 4-7. Connectors' List

Number	Pin	Connector Color	Number	Pin	Connector Color
CN4	3	white	CN5	3	black
CN6	2	white	CN7	4	gray
CN8	18	gray	CN9	16	gray
CN10	4	white	CN11	5	white
CN12	4	white	CN13	4	black

Note : Disconnect the cable for CN10 and CN11 after releasing the connector locks by pulling up.

7. Remove the printer mechanism.

✓CHECK POINT

- ***Notice the connector for cables CN10 and CN11, and align the red colored cable to pin 1 of the connector.***
- ***The tightening torque for the printer mechanism mounting screws : 0.78 ~ 0.98 Nm (10 ~ 12 Kgf-cm)***

ADJUSTMENT ▶

If remove or replace the printer mechanism once, adjust the bi-directional print alignment and reset the TPE level. (Refer to Section Chapter4.)

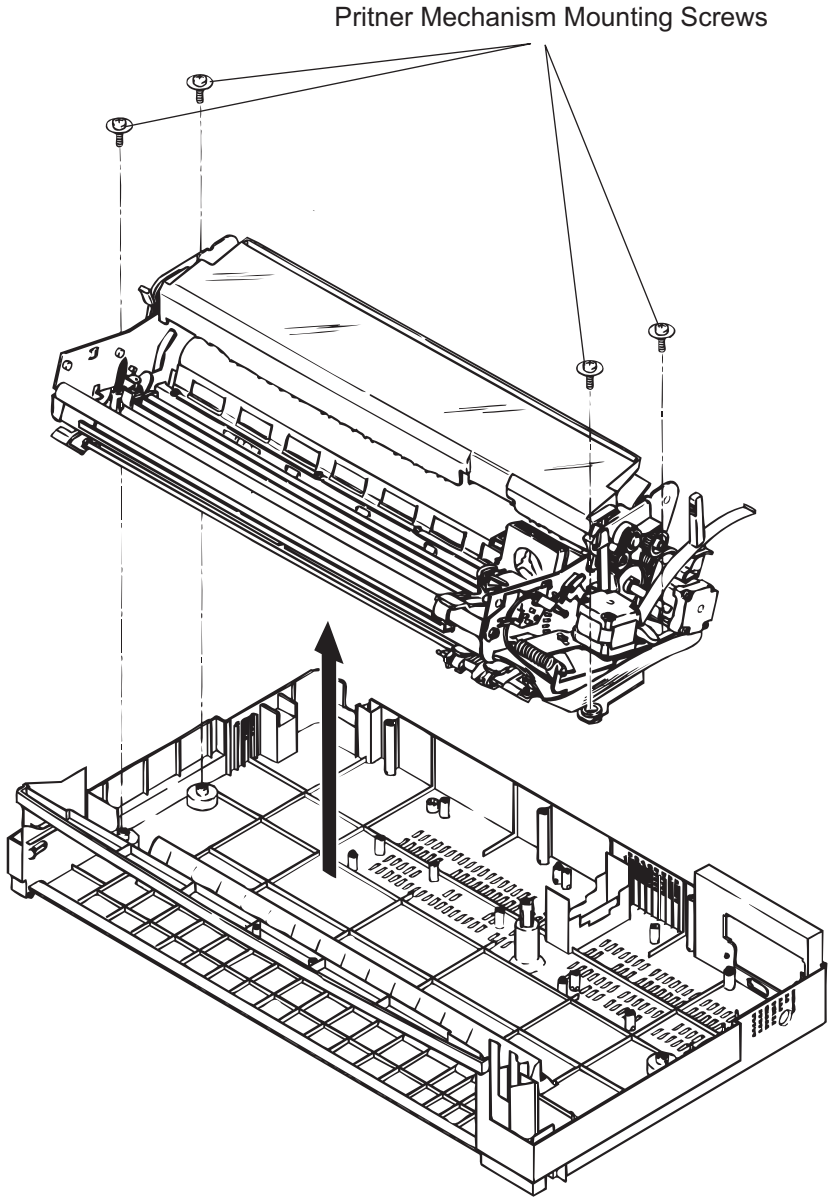


Figure 4-15. Removing the Printer Mechanism

4.2.9.1 Removing the CR Motor Assembly

1. Remove the printer cover, rear edge guide assembly, paper eject assembly and rear tractor unit. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. After releasing the extension spring 15.7, then disengage the timing belt from the CR motor Assembly.
6. Remove the two CR mounting screws securing the CR motor assembly.
7. Disconnect the cable for CN11 from the main board.
8. Remove the CR motor assembly from the printer mechanism.

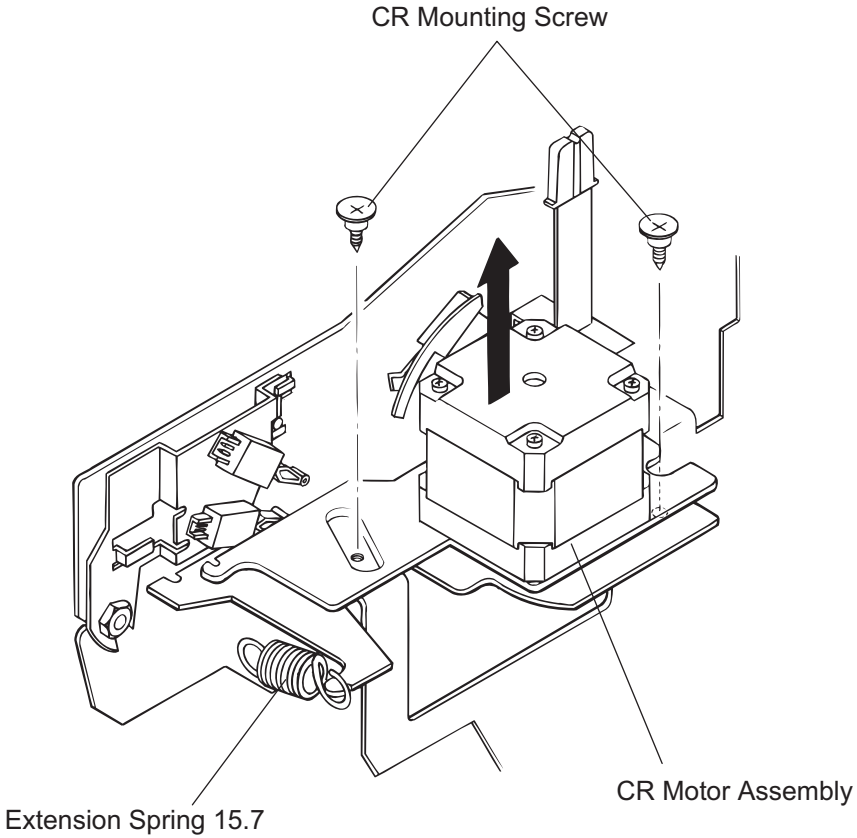


Figure 4-16. Removing the CR Motor Assembly

✓CHECK POINT

The tightening torque for the 2 CR Mounting screws : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)

ADJUSTMENT▶

Adjust the bi-directional print alignment and reset the TPE level. (Refer to Section Chapter4.)

4.2.9.2 Removing the PF Motor

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Set the release lever to the pull tractor mode.
6. Remove one CBS screw (3 × 6) and screw (3 × 10) securing the PF motor.
7. Disconnect connector CN10 from the main board assembly.
8. Remove the PF motor from the right sub frame.
9. Return the release lever to the friction feed mode.

✓CHECK POINT

- ***Before attaching the PF motor to the proper position on the right sub frame, set the release lever to the pull tractor mode (full release position).***
- ***The CB screw (3 × 8) is used to secure the upper part of the PF motor. The CBS screw (3 × 6) is used to secure the lower part of the PF motor.***
- ***The tightening torque for the CB and CBS screws : 0.8 ~ 1.0 Nm (8 ~ 10 Kgf-cm)***

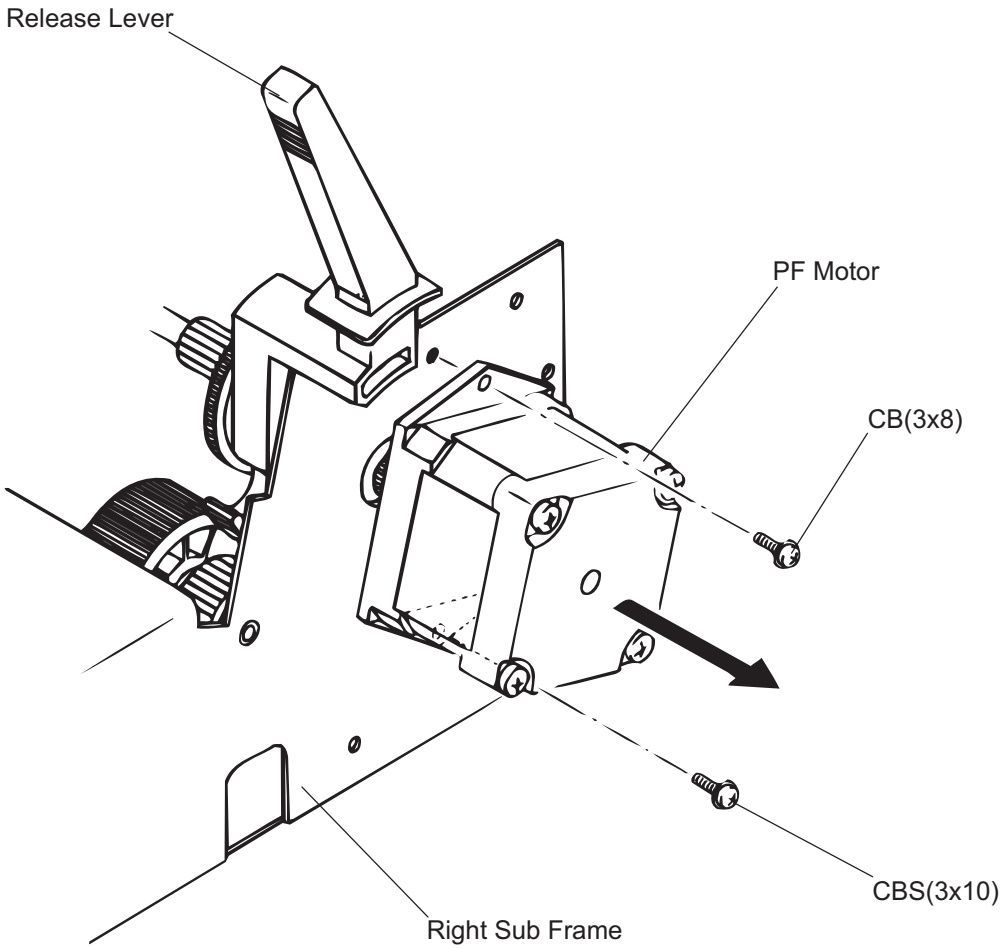


Figure 4-17. Removing the PF Motor

4.2.9.3 Removing the PG Sensor Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Remove one hexagon nut (M4) securing the PG sensor assembly to the right frame assembly.

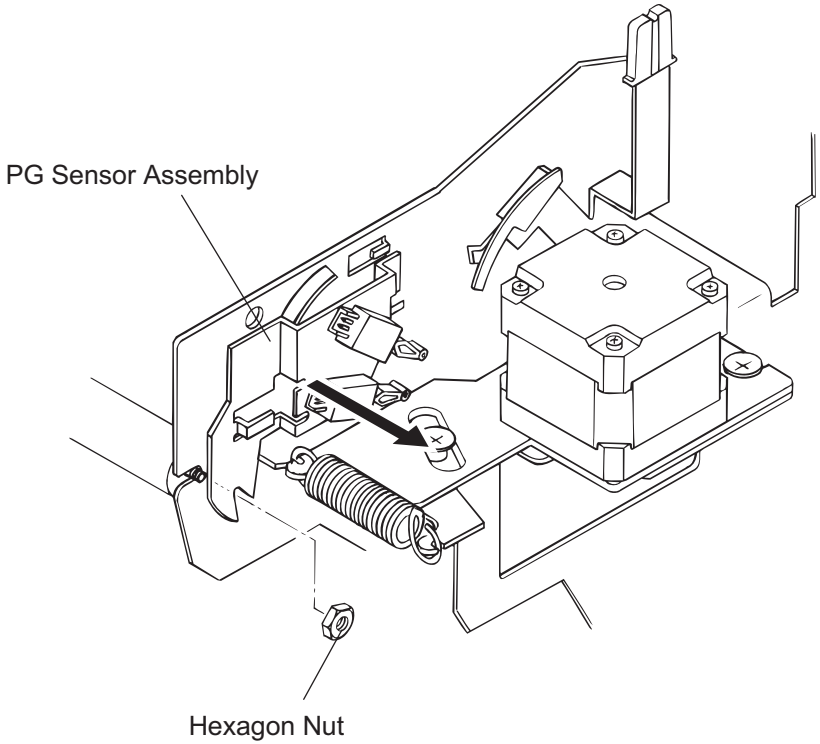


Figure 4-18. Removing the PG Sensor Assembly

✓CHECK POINT

- ***When the sensors are mounted to the PG sensor holder be sure to mount the while connector's sensor in the upper position as shown in the following figure.***
- ***When securing the shaft, push the front CR guide shaft to the bottom of the cutout.***
- ***The tightening torque for the hexagon nut : 1.18 ~ 1.37 Nm (12 ~ 14 Kgf-cm)***

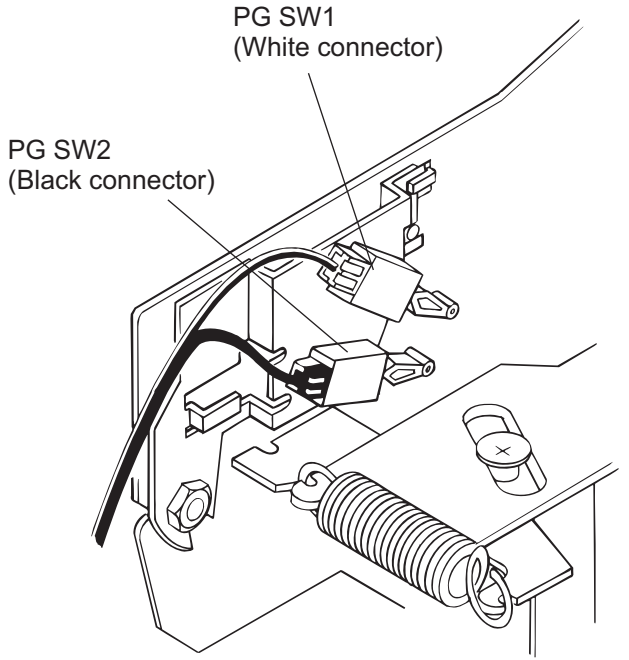


Figure 4-19. Mounting the Sensors for PG Sensor Holder

4.2.9.4 Removing the Right Frame Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Remove the CR motor assembly. (Refer to Section 4.2.9.1.)
6. Remove the PF motor. (Refer to Section 4.2.9.2.)
7. Remove the PG sensor assembly. (Refer to Section 4.2.9.3.)
8. Remove the hexagon nut (M4) securing the gap adjust lever. Then, remove the lever from the right frame assembly.
9. Remove one CBS screws (3 × 6) securing the platen cover to the right frame assembly.
10. Remove two CBS screws (3 × 6) securing the right frame assembly at the positions illustrated.
11. Remove the right frame assembly.

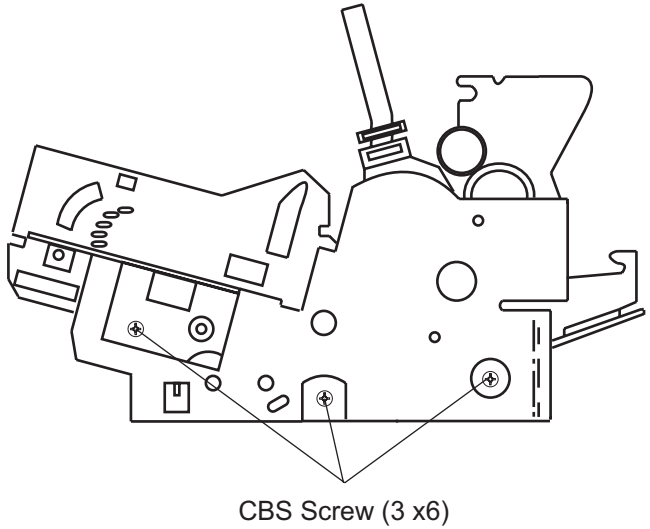


Figure 4-20. Removing the Right Frame Assembly

ADJUSTMENT ▶ ***Adjust the platen gap and Bi-directional print alignment. (Refer to Chapter 5.)***

4.2.9.5 Disassembling the Right Frame Assembly

1. Remove one CBS screw (3 × 6) and one CBS screw (3 × 8) securing the right sub frame. (The bold line in the illustration is the right sub frame.)
2. Remove the right sub frame from the right frame.

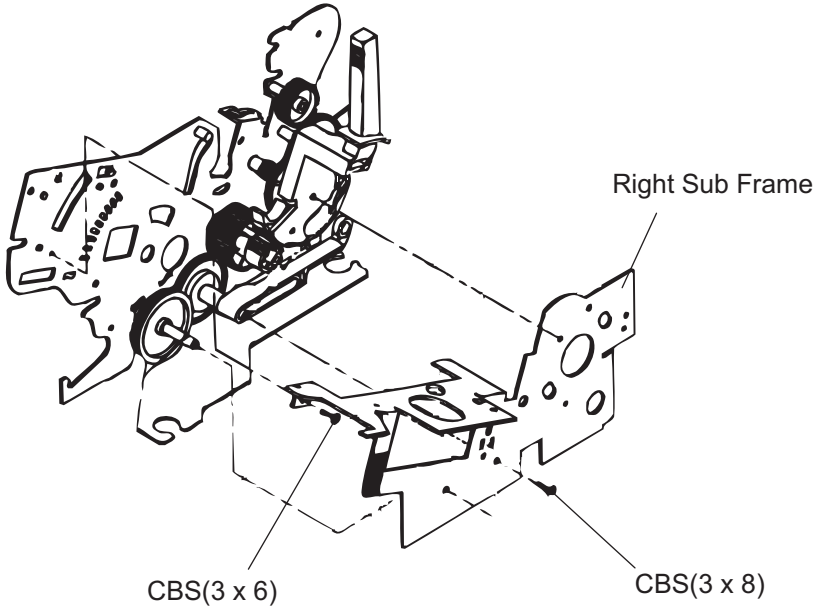


Figure 4-21. Removing the Right Sub Frame

✓CHECK POINT

- ***The tightening torque for the CBS screws (3 × 6) and (3 × 8) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***
- ***The tightening torque for the hexagon nut : 1.18 ~ 1.37 Nm (12 ~ 14 Kgf-cm)***
- ***Mount the 11 parts above on the right frame assembly, as shown in the following figures.***

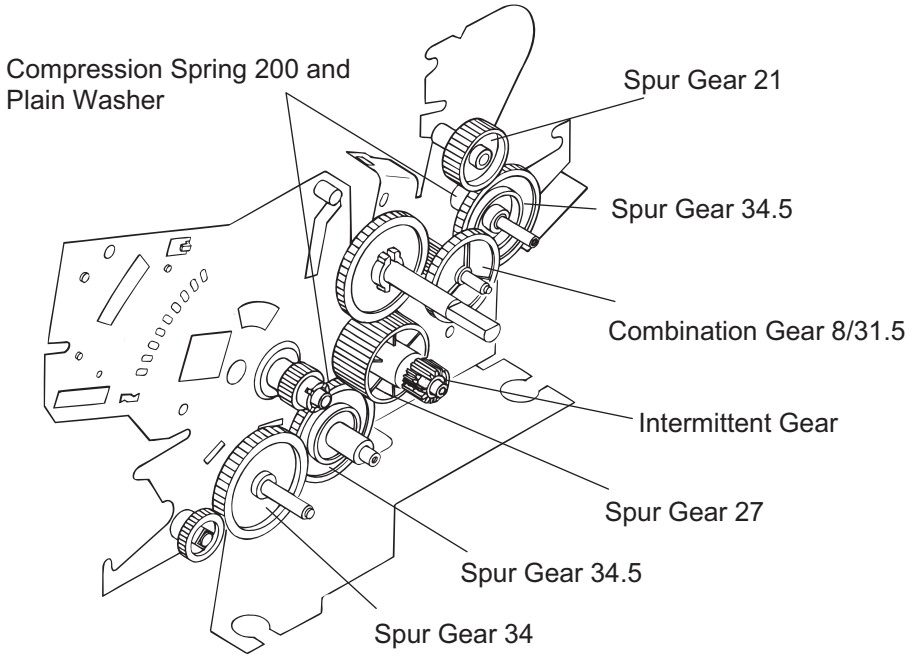


Figure 4-22. Engaging Gears 1

ADJUSTMENT▶

Adjust the Bi-directional print alignment. (Refer to chapter 4.)

✓CHECK POINT

- ***Notice how the intermittent gear, release lever, and release transmission lever are engaged.***
- ***When engage the release lever and release transmission lever to the tractor clutch cam, notice the points in the following figure.***

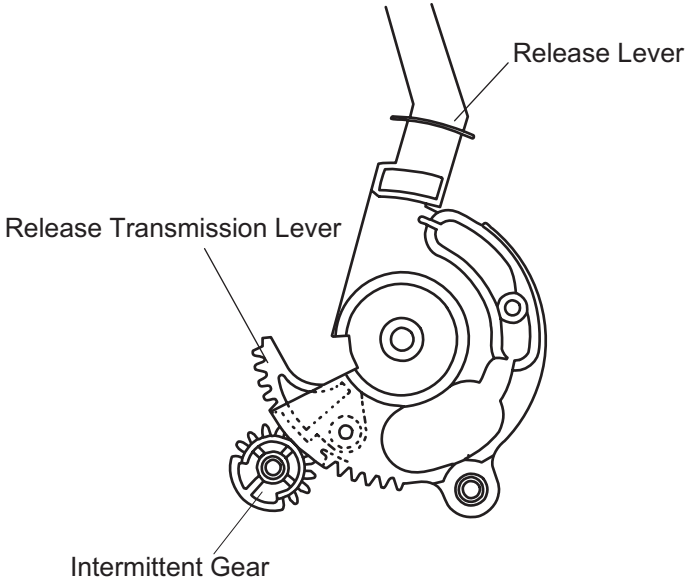


Figure 4-23. Engaging Gears 2

✓CHECK POINT

Pay attention to how the tractor clutch cam is engaged as following figure.

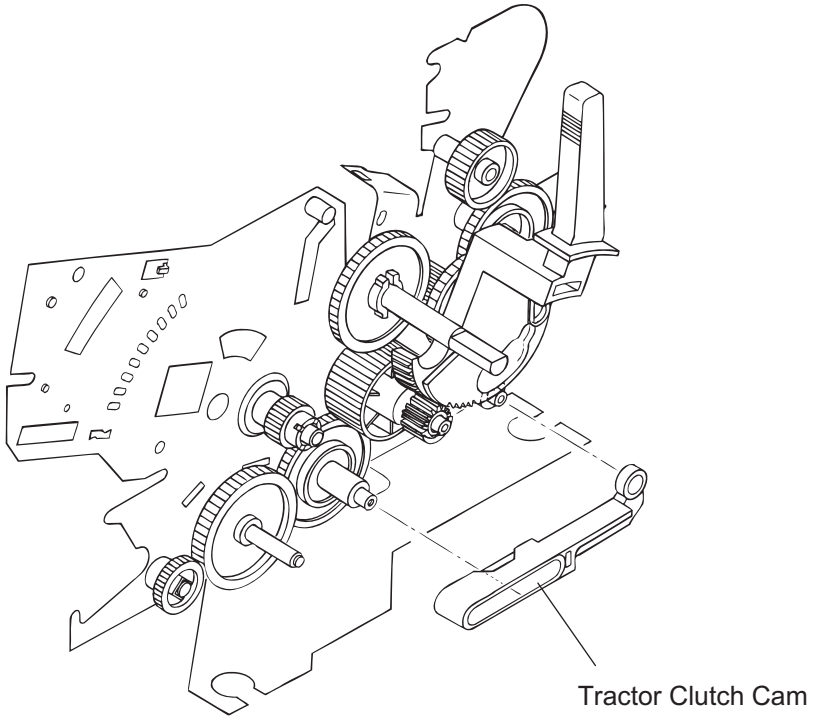


Figure 4-24. Engaging the Tractor Clutch Cam

4.2.9.6 Removing the Left Frame Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Disconnect two connector cables from two release lever sensors, and then disconnect the connector cable from the HP sensor.
6. Remove the platen assembly. (Refer to Section 4.2.6.)
7. Remove one CBS screws (3 × 6) securing the platen cover to the left and right frame assemblies.
8. Remove one hexagon nut (M4) securing the CR guide shaft and left frame.
9. Remove four CBS screws (3 × 6) securing the left frame assembly.
10. Remove the left frame assembly.

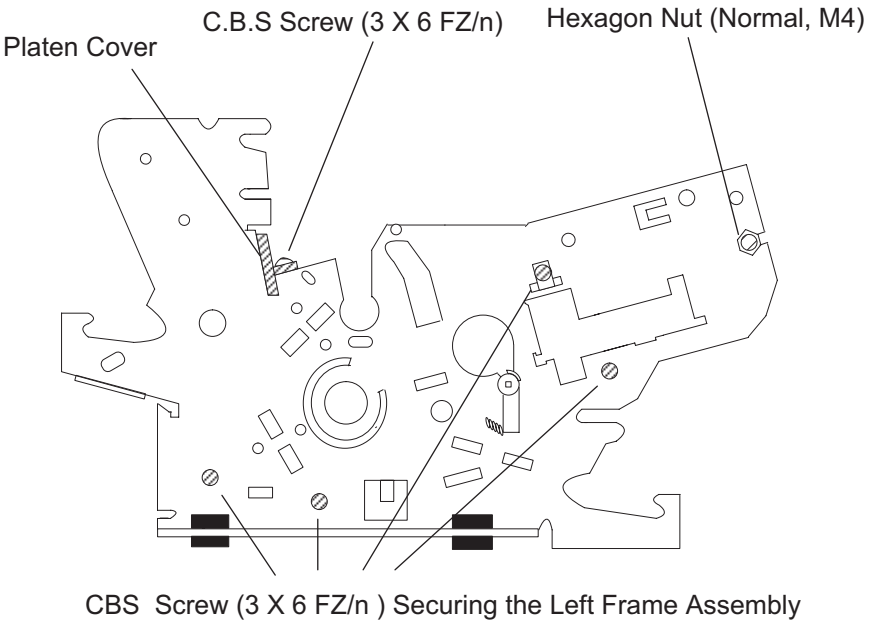


Figure 4-25. Removing the Left Frame Assembly

✓CHECK POINT

- ***The tightening torque for the CBS screws (3 × 6) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***
- ***The tightening torque for the hexagon nut : 1.18 ~ 1.37 Nm (12 ~ 14 Kgf-cm)***

ADJUSTMENT ▶

Adjust the Bi-directional print alignment. (Refer to chapter 4.)

4.2.9.7 Removing the Ribbon Drive (RD) Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Remove the left frame assembly. (Refer to Section 4.2.9.6.)
6. Remove two CBS screws (3 × 8) securing the RD assembly to the front frame.
7. Remove the RD assembly from the front frame.
8. Remove the timing belt from the DR assembly.

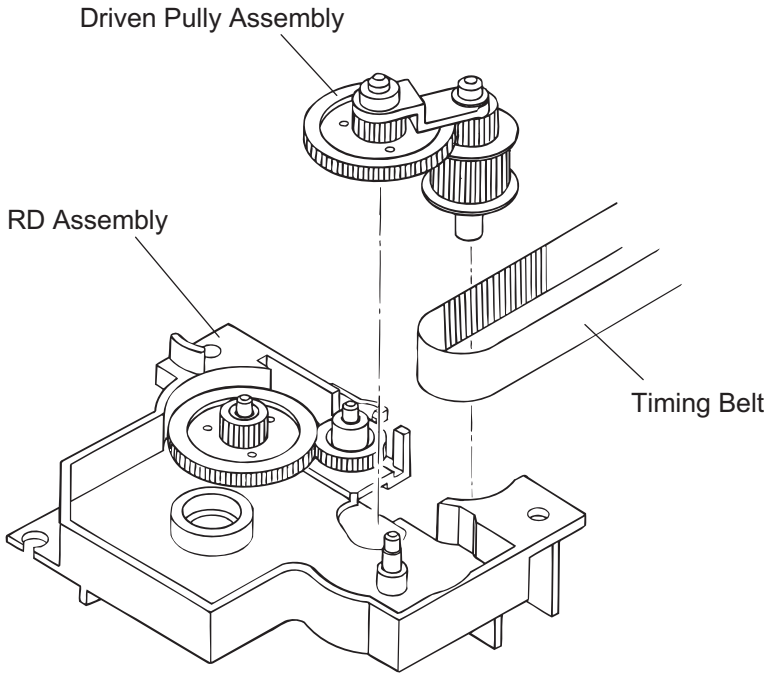


Figure 4-26. Removing the RD Assembly

✓CHECK POINT

- ***The tightening torque for the CBS screws (3 × 8) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***
- ***Notice how the gears in the RD assembly are engaged as shown in the following figure;***

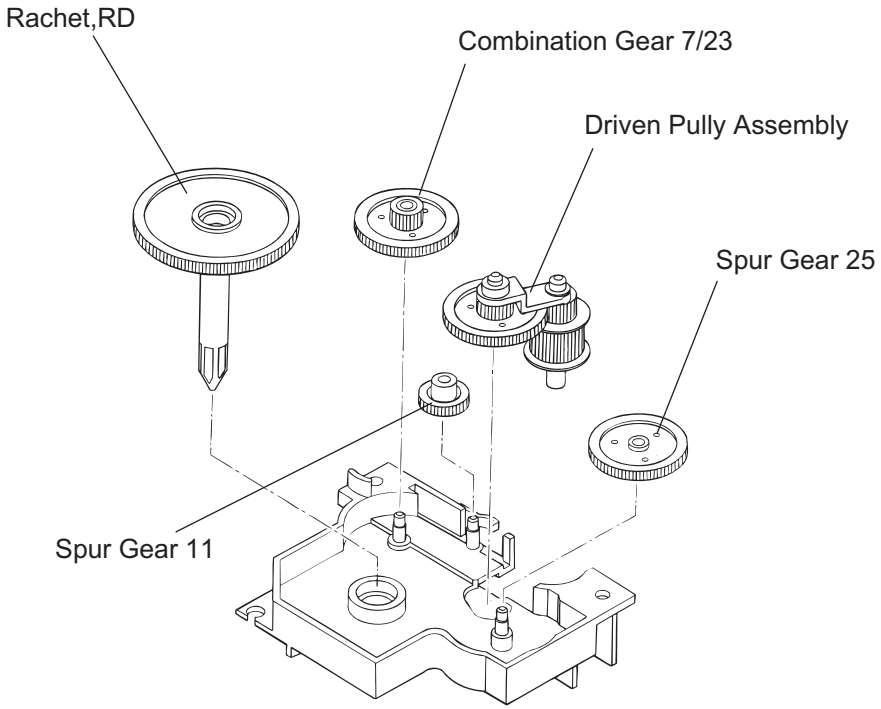


Figure 4-27. Engaging Gears for the RD Assembly

ADJUSTMENT▶

Adjust the Bi-directional print alignment. (Refer to chapter 4.)

4.2.9.8 Removing the CR Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Remove the left frame assembly. (Refer to Section 4.2.9.6.)
6. Removing the RD assembly. (Refer to Section 4.2.9.7.)
7. Disconnect 3 FFCs from the printhead and PW sensor assembly.(Refer to Section 4.2.5.)

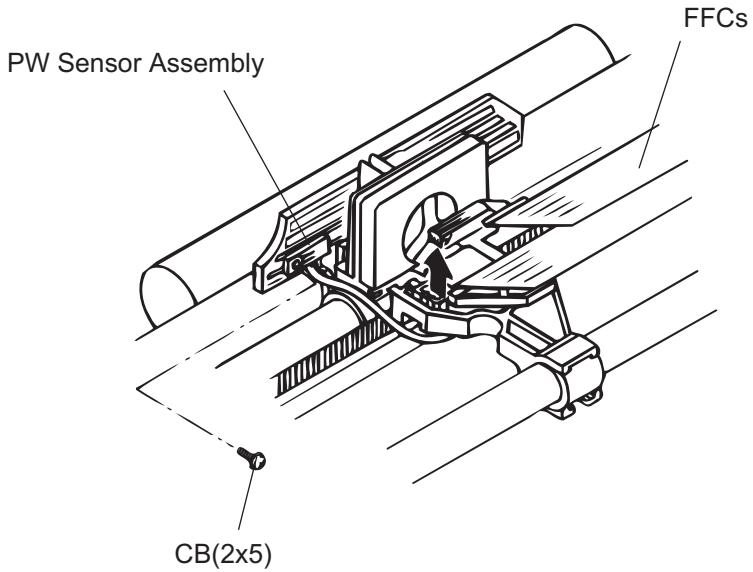


Figure 4-28. Disconnect the FFCs

8. Disengage the timing belt from the CR motor pinion gear.
9. Remove the CR assembly from the rear/front CR guide shaft.

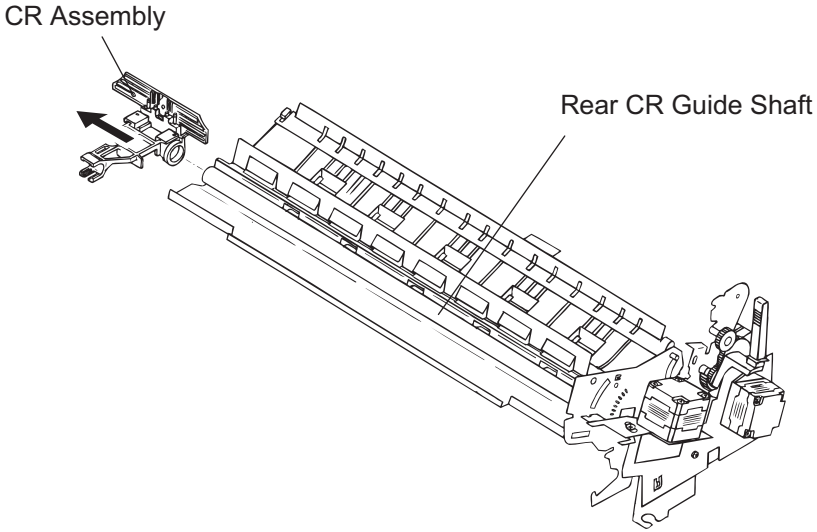


Figure 4-29. Removing the CR Assembly

10. Remove the timing belt from the 2 holding slots under CR assembly.
11. Remove the CR assembly.

✓CHECK POINT

- ***Insert the timing belt properly into the 2 holding slots at the bottom of the CR assembly.***
- ***Take up this timing belt slack between the two slots completely, as shown in the following figure;***

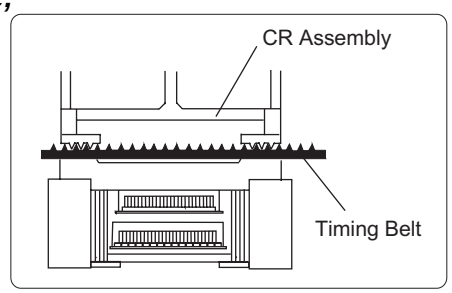


Figure 4-30. Inserting the Timing Belt

✓CHECK POINT

Insert the 2 oil pads into the proper position in the CR assembly, as shown in the following figure;

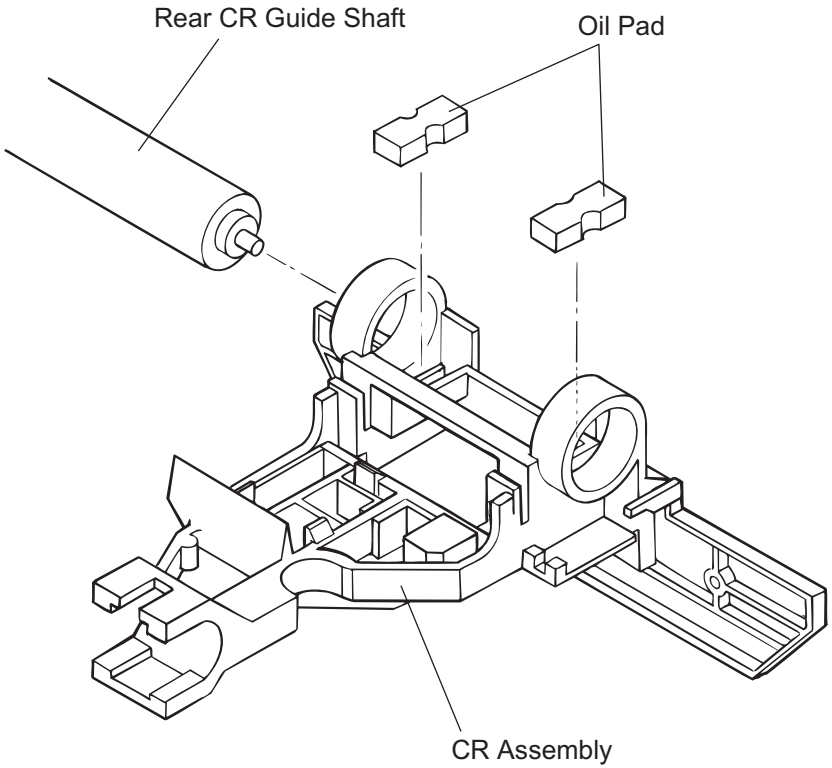


Figure 4-31. Installing the Oil Pad in the CR Assembly

✓CHECK POINT

- ***If remove the rear CR guide shaft along the CR assembly once, be sure to reinstall the rear CR guide shaft in the printer mechanism.***
- ***The rear CR guide shaft has been a drilled through hole near the right edge, and one side of the hole has a chamfered edge. This edge should be up, as shown in the following figure;***

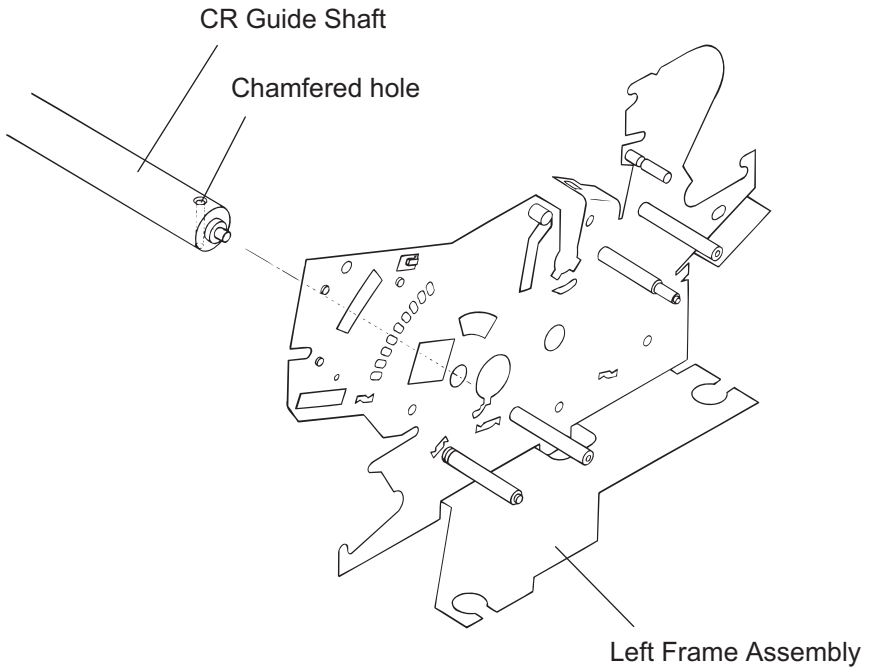


Figure 4-32. Assembling the Rear CR Guide Shaft

ADJUSTMENT▶

Adjust the Bi-directional print alignment. (Refer to chapter 4.)

4.2.9.9 Removing the Rear PE Sensor Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Turn the printer over, and insert a standard screwdriver bit or other prying tool into the hole in the rear frame as shown in the following figure;
6. Release two clips while pushing up the rear PE sensor with the screwdriver bit or other prying tool.
7. Remove the rear PE sensor assembly after disconnecting the connector.

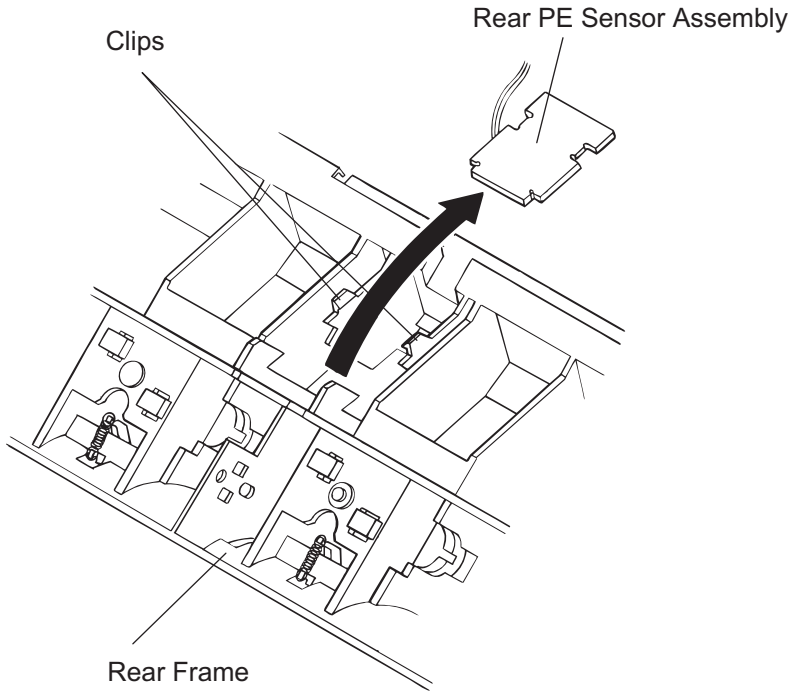


Figure 4-33. Removing the Rear PE Sensor Assembly

4.2.9.10 Removing the Front PE Sensor Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the printer mechanism. (Refer to Section 4.2.9.)
5. Turn the printer over, and insert a standard screwdriver bit or other prying tool into the hole in the rear frame as shown in the following figure;
6. Release two clips while pushing up the front PE sensor with the screwdriver bit or other prying tool.
7. Remove the rear PE sensor assembly after disconnecting the connector.

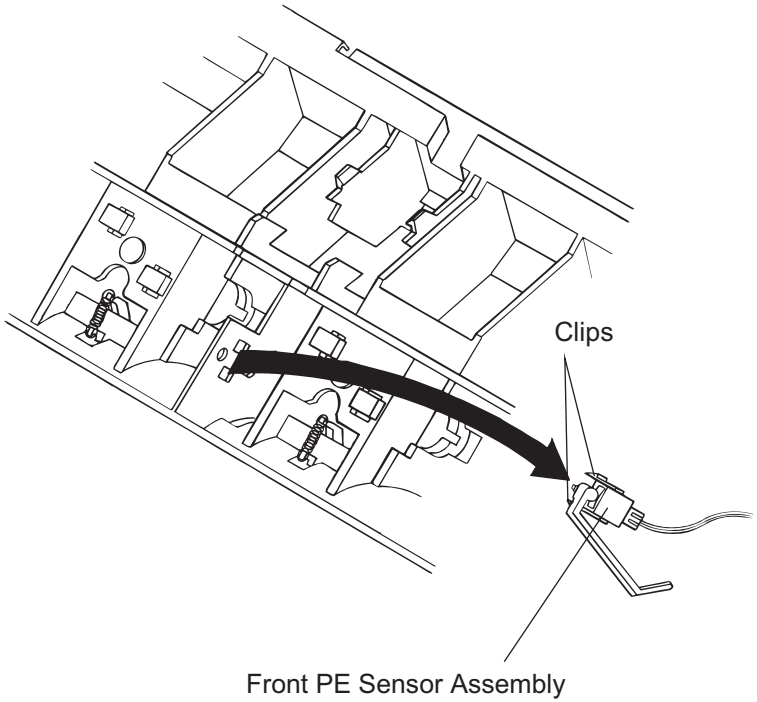


Figure 4-34. Removing the Front PE Sensor Assembly

4.2.9.11 Removing the Main Board Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Disconnect the following connectors from the main board assembly.

Table 4-8. Connectors' List

Number	Pin	Connector Color	Number	Pin	Connector Color
CN3	10	white	CN4	3	white
CN5	3	black	CN6	2	white
CN7	4	gray	CN8	18	gray
CN9	16	gray	CN10	4	white
CN11	5	white	CN12	4	white
CN13	4	black	CN15	22	white

Note1 :Disconnect the cable for CN10 and CN11 after releasing the connector locks by pulling up.
Note2 : Disconnect the cable for CN3 by pushing down the connector cover.

5. Remove three CBS screws (3 × 4) securing the upper shield plate to the printer mechanism and the upper I/F grounding plate on the main board assembly.
6. Remove two CBS screws (3 × 12) securing the upper connector cover.
7. Remove five CBS screws (3 × 12) and one CBC lamitite screw (3 × 8) securing the main board assembly to the lower housing assembly.
8. Remove the option I/F cage from the main board by releasing the hooks which is fixing it to the main board.
9. Remove the main board assembly with the upper I/F grounding plate.

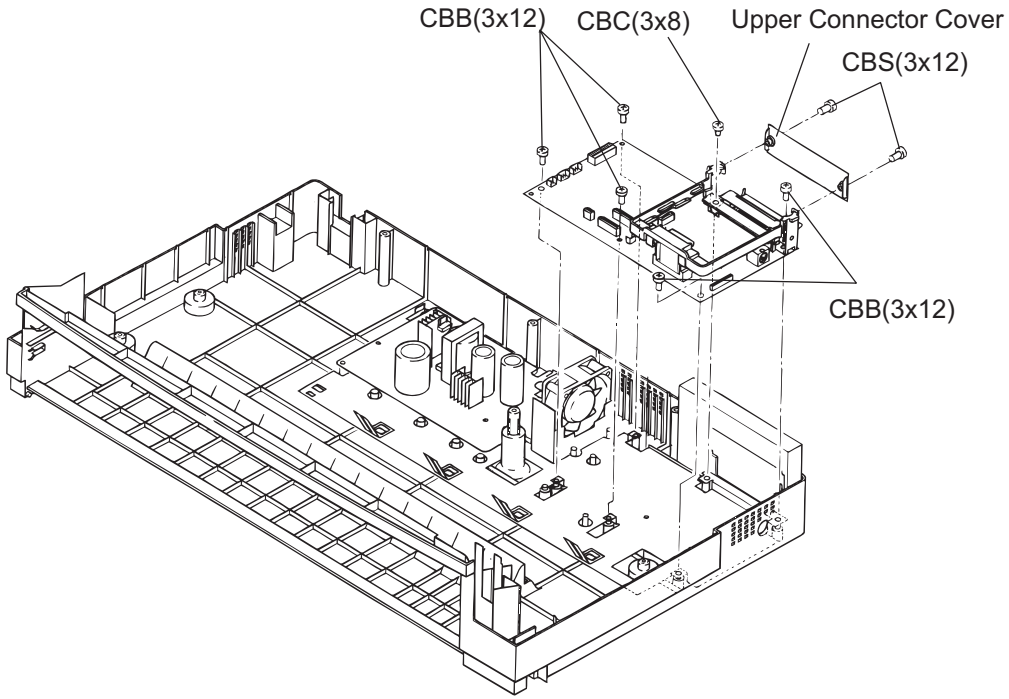


Figure 4-35. Removing the Main Board Assembly

✓CHECK POINT

- ***Notice the location of CBC lamitite screw (3 × 8) refer to the following figure.***
- ***Lock CN10 and CN11 by pushing down each connector's lock after inserting the connector cable.***
- ***The tightening torque for the CBB screws (3 × 12) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***
- ***The tightening torque for the CBB screws (3 × 8) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***

ADJUSTMENT ▶

If replace the main board, adjust the bi-directional print alignment and run the default setting program. (Refer to Chapter 5.)

4.2.9.12 Removing the Power Supply board Assembly

1. Remove the printer cover, the rear / front edge guide assemblies, front cover, paper eject assembly, and rear / fronts tractor units. (Refer to Section 4.2.1.)
2. Remove the panel board assembly. (Refer to Section 4.2.2.)
3. Remove the upper housing assembly. (Refer to Section 4.2.7.)
4. Remove the five CBB screws (3 × 12) securing the power supply board assembly.
5. Disconnect the cable for CN3 on the main board assembly.
6. Disconnect the cable for the fan motor from CN3 on the power supply board assembly.
7. Remove the power supply board assembly while pulling up the fan motor.

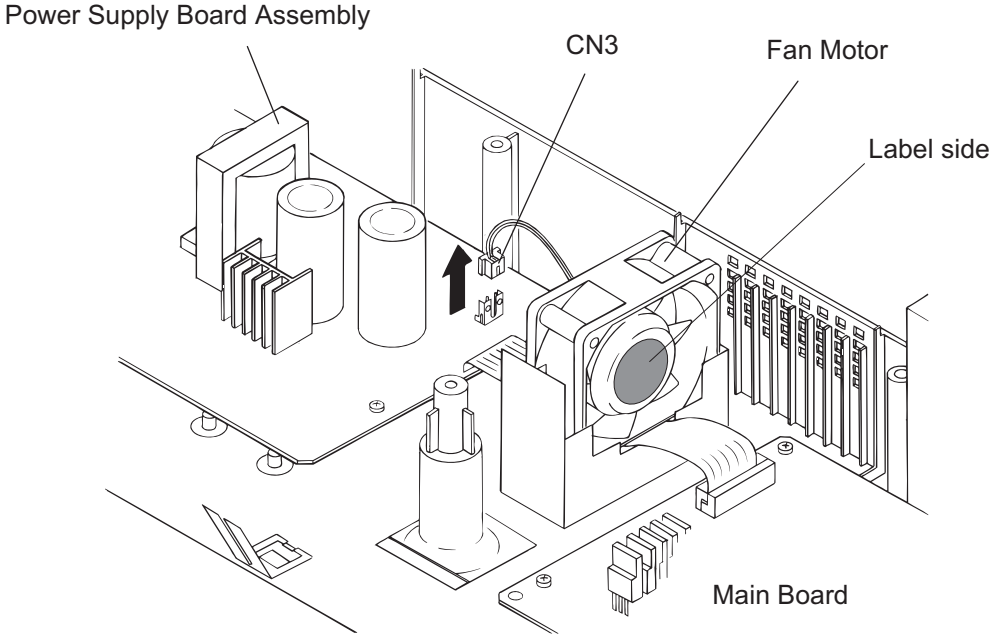


Figure 4-36. Removing the Power Supply Board Assembly

✓CHECK POINT

- ***Insert the cable for CN2 on the power supply board under the fan motor.***
- ***The tightening torque for the CBB screws (3 × 12) : 0.78 ~ 0.98 Nm (8 ~ 10 Kgf-cm)***
- ***Notice the direction for mounting the fan motor. The label side of fan faces for the main board assembly. (Refer to the above figure.)***

4.2.10 Disassembly and Assembly of CSF Bin 1

This section describes procedure for disassembling and assembling the operational cut sheet feeder. In general, you can install a component in the CSF simply by reversing the procedure for removing. Therefore, this section dose not describe assembly procedures in most cases. If necessary, special notes on assembling a component are given at the end of description of each procedure.

4.2.10.1 Disassembling the Right Side Block

1. Remove the CFS gear cover by pushing and releasing the 4 clips in the following figure.

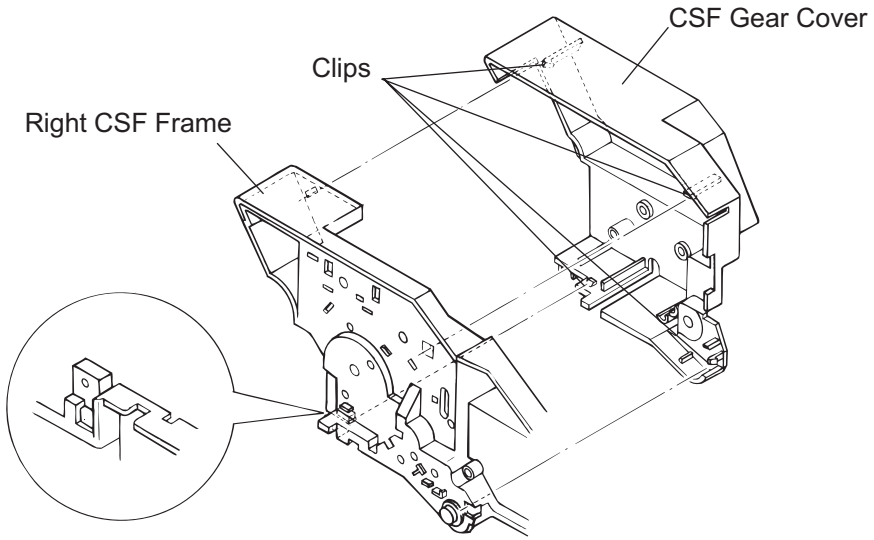


Figure 4-37. Releasing the clips for the CSF Gear Cover

2. Remove three CPB tight (3 × 12) screws securing the stepping motor to the CSF frame.
3. Disconnect connector CN1 from the CSF board assembly, ans then remove the stepping motor.
4. Remove one CPB tight (3 × 12) screw securing the CSF board assembly, and disconnect connector CN2.
5. Remove the CSF board assembly by releasing one clip fixing the CSF board assembly to the right CSF frame.
6. Remove the 13 gears mounted on the right CSF frame.

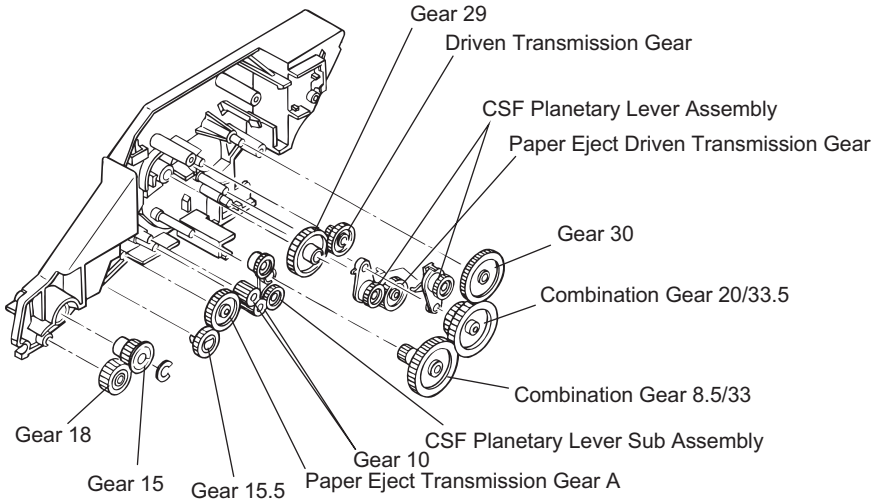


Figure 4-38. Engaging 13 Gears

✓CHECK POINT

- ***Be careful of the cable alignment for the CN1 connector cable and earth cable.***
- ***Align those cables as shown in the following figure. If these cables are not aligned properly, the CSF gear cover cannot be assembled properly.***

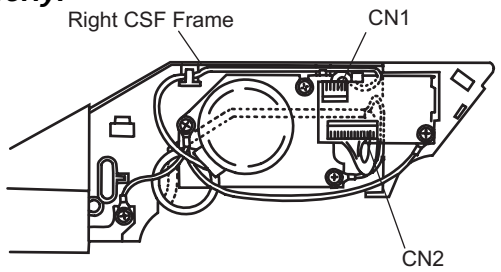


Figure 4-39. Cable Alignment

4.2.10.2 Disassembling Paper Support Block Assembly

1. Remove the CSF gear cover. (Refer to Section 4.2.10.1.)
2. Remove the stepping motor. (Refer to step2 and 3 in the Section 4.2.10.1.)
3. Remove one E-ring fixing the right edge of the paper feed shaft.

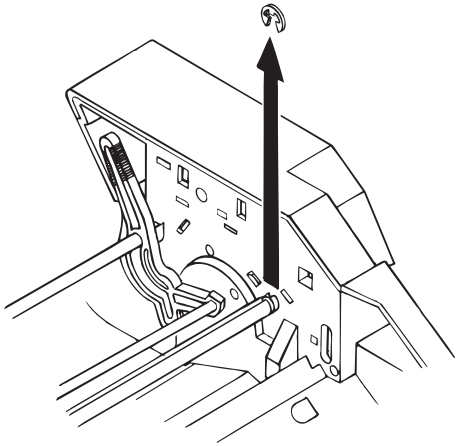


Figure 4-40. Removing the E-ring

4. Remove the gear 29 from the right edge of the paper feed shaft.

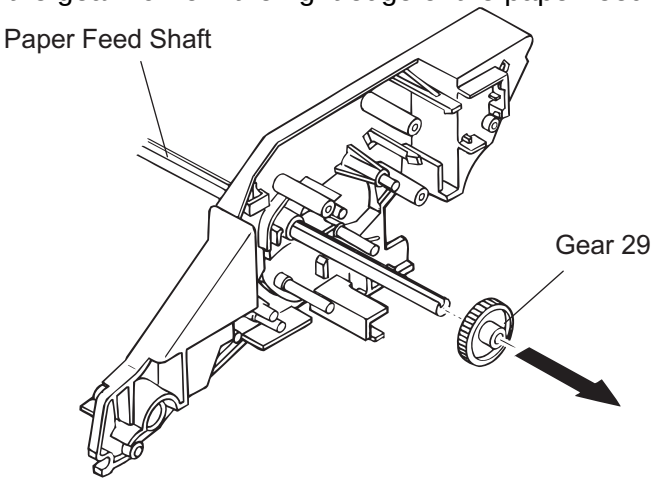


Figure 4-41. Removing the Gear 29

5. Remove the paper feed shaft pulling it toward the right side.
6. Remove one CSF tight (3 × 8) screw securing the paper support shaft to the right CSF frame, as shown in the following figure.
7. Remove the paper support assembly along with the paper support shaft and paper shaft holder by pulling upward.

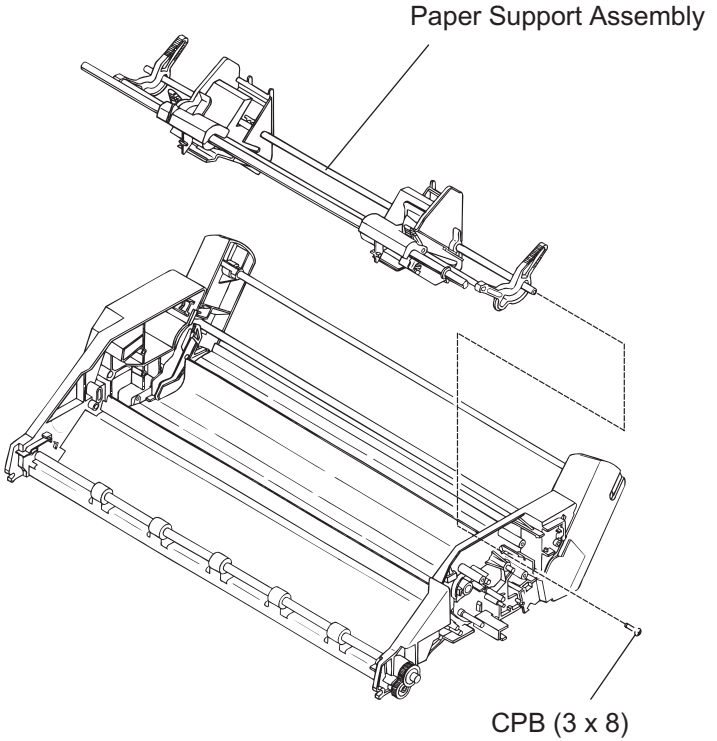


Figure 4-42. Removing the Paper Support Assembly

8. Remove both paper feed roller from both paper support assemblies.
9. Remove both paper loading roller cover assemblies by releasing the clips fixing them to the paper support assembly.

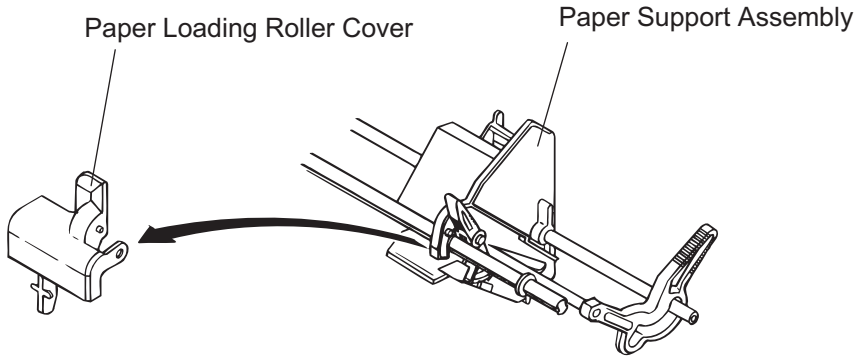


Figure 4-43. Removing the Paper Loading Roller Cover Assembly

10. Remove the paper support shaft by pulling it toward the right or left side.
11. Remove the paper holder spring.

✓CHECK POINT

Be sure to assemble the paper feed roller into the proper side. Because, the right and left rollers are not interchangeable each other.

4.2.10.3 Removing the Paper Eject Assembly Cover

1. Remove the paper assembly cover by releasing two clips located along both edges of the paper eject assembly cover, as shown in the following figure.

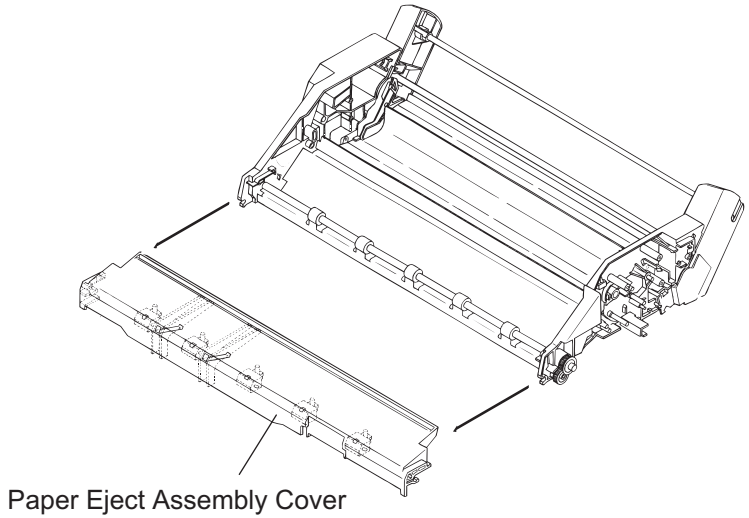


Figure 4-44. Removing the Paper Eject Assembly Cover

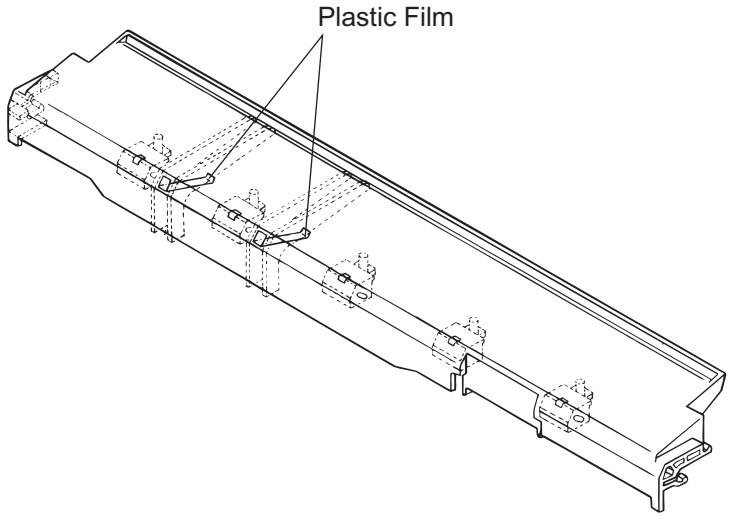


Figure 4-45. Plastic Film Located Position

✓CHECK POINT

When attaching the paper eject assembly cover to the CSF unit, pay attention to assemble the position of 2 pieces of thin plastic film glued on the reverse side of the paper eject assembly cover, as shown in the following figure.

4.2.11 Disassembly and Assembly of CSF Bin 2

4.2.11.1 Disassembling the Right Side Block

1. Remove the gear train cover by releasing the four clips shown in the following figure.

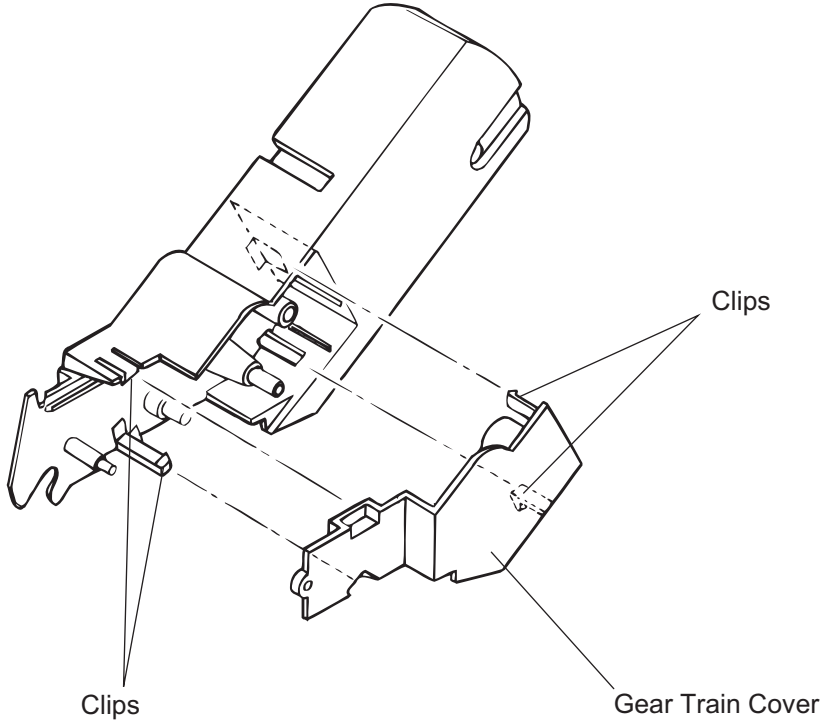


Figure 4-46. Removing the Gear Train Cover

2. Remove the following 5 gears and the spring from the CSF frame.

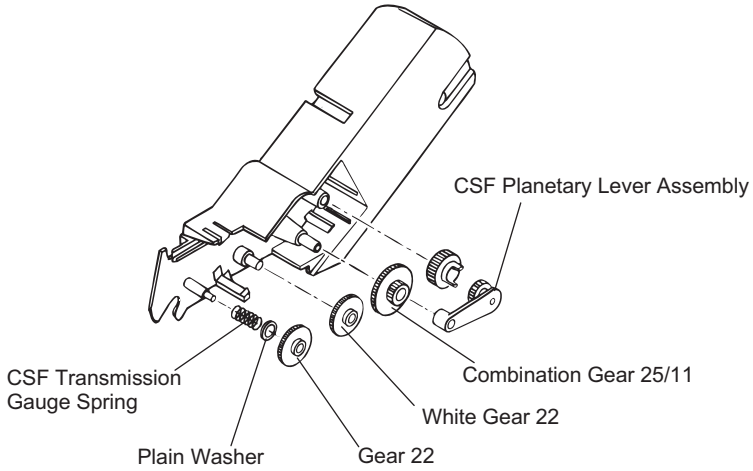


Figure 4-47. Removing Gear train

4.2.11.2 Disassembling the Paper Support Block Assembly

1. Remove the E-ring fixing the paper feed roller shaft to the right CSF frame.
2. Remove two CTBS (3 × 8) screws securing the paper support shaft to both right and left CSF frame.

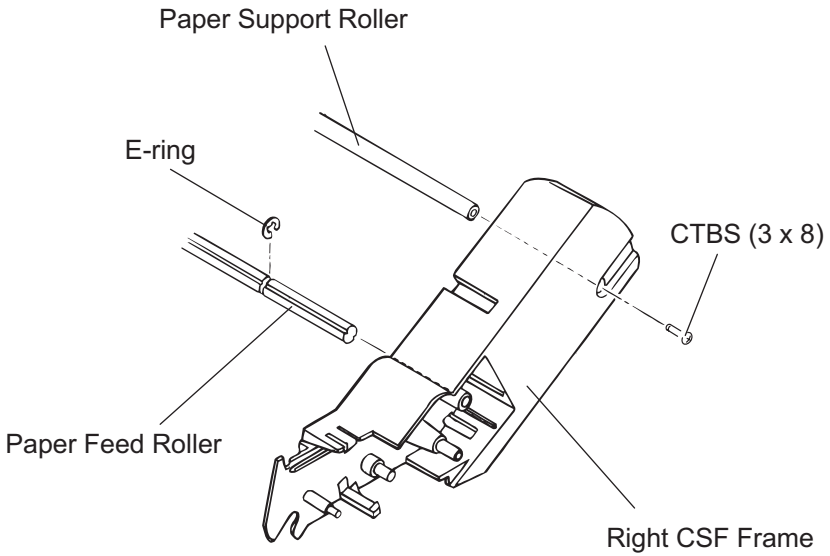


Figure 4-48. Removing E-ring and Screw

3. Remove both paper support assemblies along with the paper feed roller shaft and paper support shaft.
4. Remove the paper feed shaft from both paper support assemblies by pulling them toward the right or left side.
5. Remove both paper feed roller from the paper support assemblies.
6. Remove both CSF roller cover by releasing the clips fixing them to the paper support assemblies.
7. Remove the paper support shaft by pulling out it toward the right or left side.

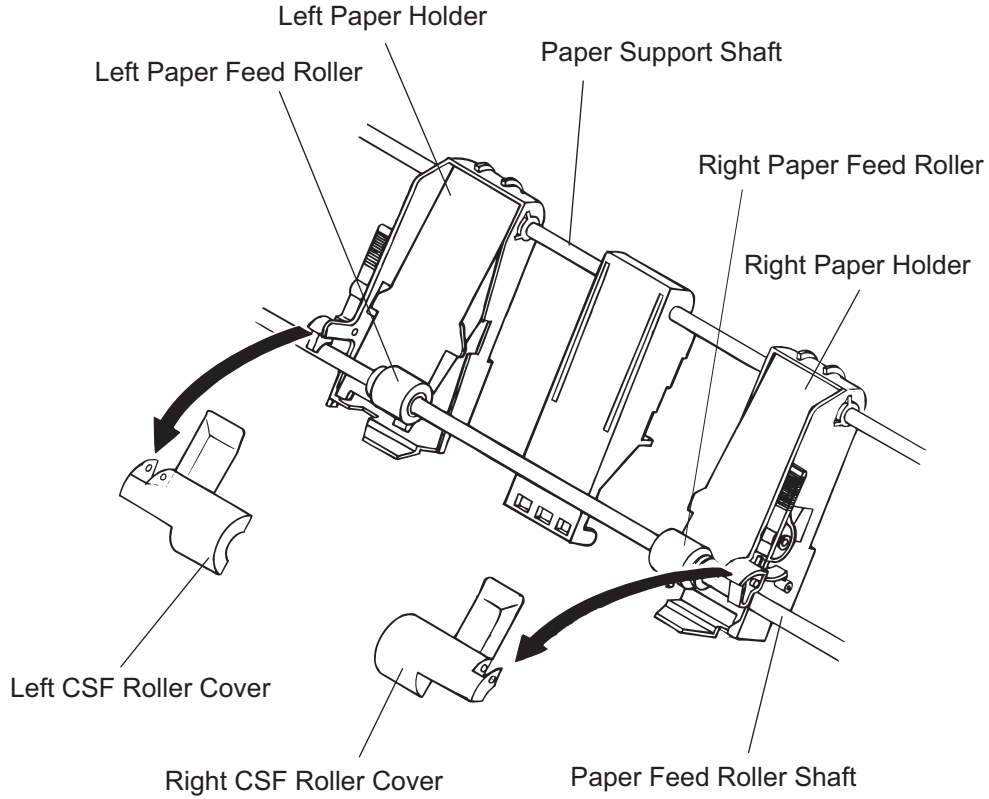


Figure 4-49. Removing the Paper Feed Roller Covers

8. Remove the paper holder sliding it along the paper support shaft, and then remove the paper holder spring from the paper holder.

✓CHECK POINT

Be careful to assemble the paper feed roller into the proper side of the paper feed roller shaft. Because, The right and left rollers are not interchangeable each other.

CHAPTER

5

ADJUSTMENT

5.1 ADJUSTMENT OVERVIEW

5.1.1 Required Adjustment

This section describes what adjustments are required after any part is removed or replaced. The following table shows the relationship between the repaired item and the adjustment.

Table 5-1. Required Adjustment

Required Item / Adjustment	Platen Gap	Bi-directional Print Alignment	Factory Setting	TPE Level Reset
Printer Mechanism Replacement	—	❍	—	❍
Main Board Replacement	—	❍	❍	—
PW Sensor Assembly Replacement	—	—	—	❍
Platen Assembly Replacement or Removal	❍	—	—	—
CR Motor Assembly Replacement or Removal	—	❍	—	—
Right Frame Assembly Replacement or Removal	❍	❍	—	—
Right Frame Disassembly	—	❍	—	—
Left Frame Replacement or Removal	❍	❍	—	—
RD Assembly Replacement or Removal	❍	❍	—	—
CR Assembly Replacement or Removal	❍	❍	—	—

Note 1 : " — " means adjustment is not required.
Note 2 : "❍" means adjustment is required.

✓CHECK POINT

When any part is replaced or reassembled, use the Check Program included on the Settings Diskette to check the performance and settings of various check pattern.

5.1.2 Required Adjustment Tools

The following table shows the tools required for each adjustment.

Table 5-2. Required Adjustment Tools

Adjustment	Required Tool
Platen Gap	Thickness Gauge (B776702201)
Bi-directional Print Alignment	Settings Diskette or Remote Utility or Panel Operation
Factory Settings	Settings Diskette
TPE Level Reset	Settings Diskette

5.2 ADJUSTMENT AND RESETTING

5.2.1 Platen Gap Adjustment

If you have rotated or reassembled the rear CR guide shaft or parallelism adjustment bushing, or if printing is too light or too dark, even at the proper PG lever position, perform this adjustment at 3 positions : left end column, center column and right end column.

1. Remove the printhead from the CR assembly once. (Refer to Chapter 4.)
2. Remove the ribbon mask from the ribbon mask holder using tweezers, as shown in the following figure.

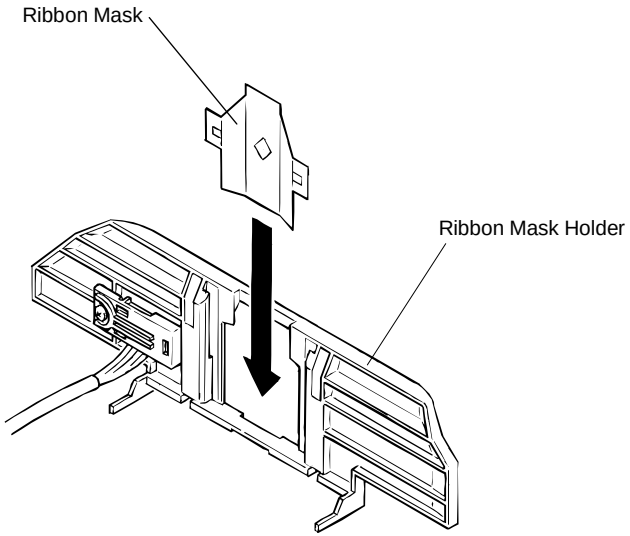


Figure 5-1. Removing the Ribbon Mask

3. Attach the printhead to the CR assembly again, tightening the 2 CBS screws (3×10).
4. Move the printhead to left end column position.
5. Set the release lever to the FRICTION position.
6. Set the PG adjust lever to the second slot from rear of the printer mechanism as shown in the following figure.
7. Loosen the hexagon nut (M4) securing the PG adjust lever while setting the PG adjust lever to the second slot position from the rear of the printer mechanism.

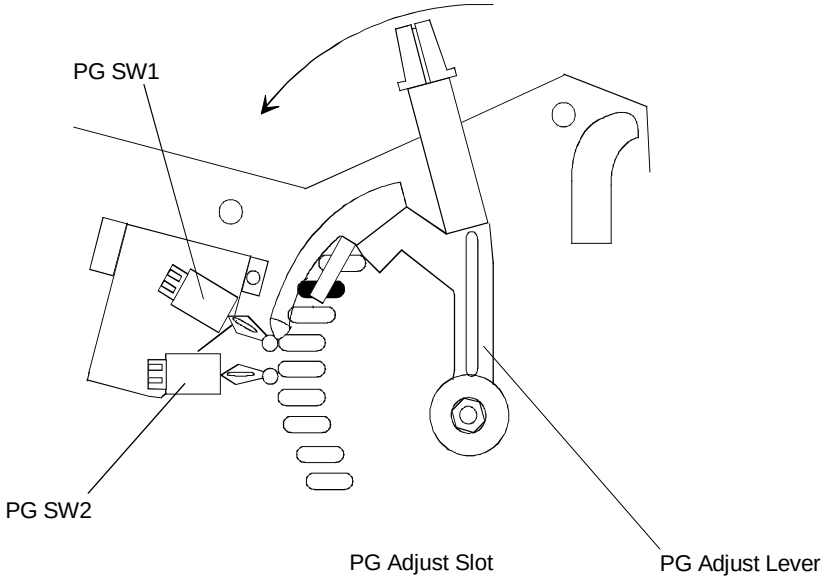


Figure 5-2. Settings the PG Adjustment Lever

8. Insert the thickness gauge vertically between the printhead and platen.
9. Insert a thin screwdriver into the drilled hole, located at the right edge of the rear CR guide shaft and adjust the platen gap by moving the screwdriver to forward or backward until the gap is large enough for a 0.42 mm thickness gauge but too narrow for a 0.45 mm thickness gauge.

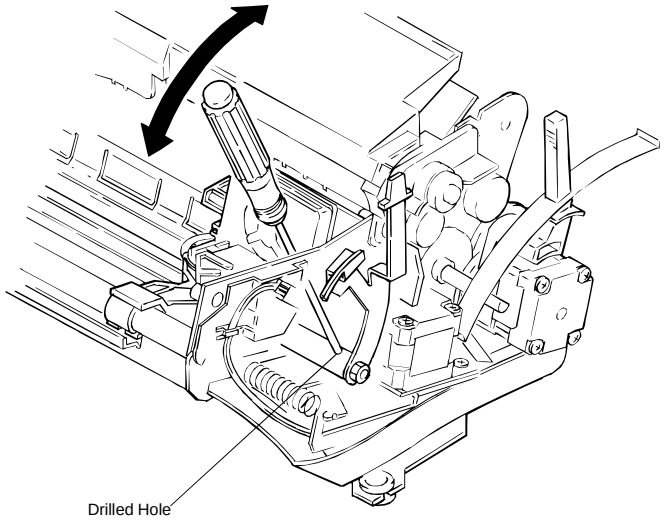


Figure 5-3. Platen Gap Adjusting

10. When the gap is correct at the 5th column, check the platen gap at the center column, and then the right edge column position.
11. If the platen gap is wider at the left edge column than right edge column, adjust the parallelism for rear CR guide shaft by moving the parallelism adjustment bushing backward. If the platen gap is more narrow for the left edge column than the right edge column, adjust the parallelism of the CR guide shaft by moving the parallelism adjustment bushing forward. Refer to the following figure.

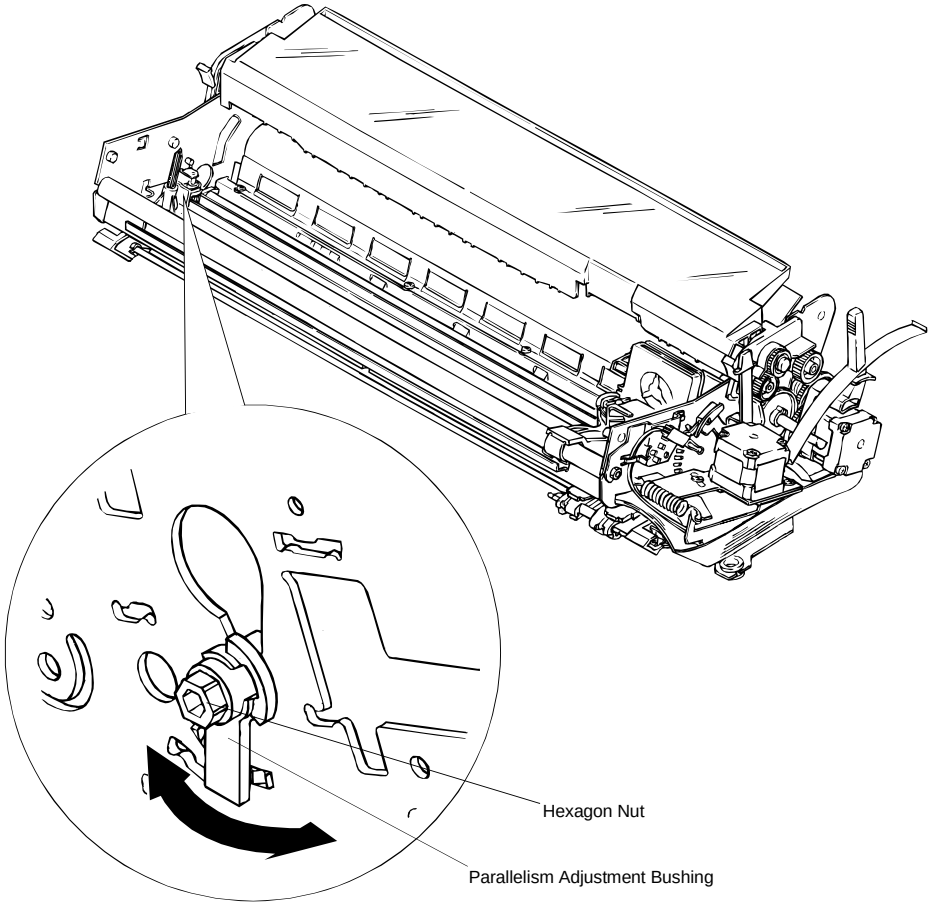


Figure 5-4. Adjusting the Parallelism of the CR Guide Shaft

12. Continue performing adjustment step 8 to 11 until the platen gap correct at all 3 positions. After completing the adjustment, remove the screwdriver from the rear CR guide shaft.
13. After inserting the ribbon mask in the ribbon mask holder and installing the printhead into CR assembly, tighten two CBS screws (3×8) to attach the printhead.
14. Tighten the hexagon nut (M4) securing the PG adjust lever.

5.2.2 Bi-directional Print Alignment (Bi-d) Adjustment

This section describes the procedure for adjustment the bi-directional print alignment, required after mechanism repair. This procedure is also necessary if you replace the main board assembly or EEPROM, because the adjusted value is written to the EEPROM on the main board. You can perform the adjustment from the setting diskette, using the control panel, or with a remote utility. This section describes the adjustment procedure with the diskette first, and then describes the adjustment procedure using the control panel.

✓CHECK POINT

- ***When the main board is replaced, reset the Factory Setting first, then perform the Bi-directional print alignment.***
- ***Do not perform the Bi-directional print alignment if the input voltage is fluctuating heavily.***
- ***When you run the GWBASIC, the PC must be switched from Windows to DOS prompt condition.***
- ***When you perform the Bi-d adjustment, use the 15 inch width continuous paper.***

5.2.2.1 Bi-d Adjustment using the Setting Diskette

1. Insert the Setting Diskette into Drive A of the PC and the power on.
2. Type **GWBASIC** and press **ENTER** to run the BASIC.
3. Load and run the adjustment program. First, the program displays Machine Select Menu.

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Printer select    ]
> (1)   9 pins
  (2) 24 pins
```

Figure 5-5. Machine Select Menu

4. Highlight **9 pins** by moving the cursor with ↑ or ↓ key and select it by pressing **ENTER**.
5. After select **9 pins**, the display shows the following menu;

```
Program : J******        Setting : ******
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Setting File    ]
> (1)  DEFSTD
  (2)  EURSTD
  (3)  NLSP
  (4)  ITALIC
  (5)  RUSSIAN
```

Figure 5-6. Setting File Menu

Table 5-3. Destination Settings

Destination	Setting	Destination	Setting
EAI	USASTD	EAI (Latin)	USASTD
EIRO	EURSTD	EDG	EURSTD
EUL	EURSTD	EUL (SCANDINAVIA)	EURSTD
EFS	EURSTD	EIS	EURSTD
EIB	EURSTD	EDG (NLSP)	NLSP
EUL (MIDDLE EAST)	DEFSTD	EAL	DEFSTD
ESP	DEFSTD	EHK	DEFSTD

6. In the menu, highlight the factory settings for the printer's destination by moving the cursor with ↑ or ↓ key, and select the destination factory settings by pressing **ENTER** referring the Table 5-3.
7. After select the each factory setting, the display shows the main menu as following;

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Main MENU    ]
> (1)  Bi-d Adjust            (6) Envelope
  (2)  FF paper               (7) ---- N/A ----
  (3)  A3 Cut sheet           (8) -- SUB MENU
  (4)  A4 1P Cut sheet
  (5)  A4 6P Cut sheet
```

Figure 5-7. Main Menu

8. Highlight **Bi-d Adjust** by moving the cursor with ↑ or ↓ key and select it by pressing **ENTER**.
9. After select **Bi-D Adjust**, the display shows the Bi-D Adjustment Menu as following figure.

```
< Bi-d  adjustment >

> Mode  0  =  0
  Mode  1  =  0
  Mode  2  =  0


Cancel      Print       Speed       Value       Write       Default
[ ESC ]   [ SPACE ]   [ ↑ ↓ ]   [ ← → ]   [ RET ]   [ HOME ]
```

Figure 5-8. Bi-d Adjustment Menu

10. Highlight the mode by moving the cursor with ↑ or ↓ key, and then print the current Bi-d pattern for that mode by pressing **SPACE**.

```
Mode  0      VR0  =  0

HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
 HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

Figure 5-9. Current Bi-d Pattern

11. If the Bi-d pattern is not aligned properly, adjust it by changing the input value with ← or → key. If the second row is shifted to the right of the first row, change the value by pressing ← key, and print the new Bi-d pattern by pressing **SPACE**. If the secondary row is shifted to the left of the first row, change the value by pressing → key, and print the new Bi-d pattern by pressing **SPACE**. Perform this operation for each mode (0,1 and 2).
12. When Bi-d is corrected for each print mode, press **ENTER** to transmit the adjusted value to the main board and print the adjusted value for each mode. This operation makes the program return to the Main Menu automatically.
13. To exit this program, press **ESC** until the display returns to the DOS prompt.

✓CHECK POINT

The adjusted value is not stored in the EEPROM until the printer power off, so you must once power off and on the printer after adjustment.

5.2.2.2 Bi-D Adjustment from the Control Panel

1. Turn the printer on while pressing the **PAUSE** button to put the printer into Bi-d adjustment mode.
2. The printer print out a guide sheet, containing 25 patterns in Super Draft mode.
3. Look for the pattern most closely aligned on the sheet.

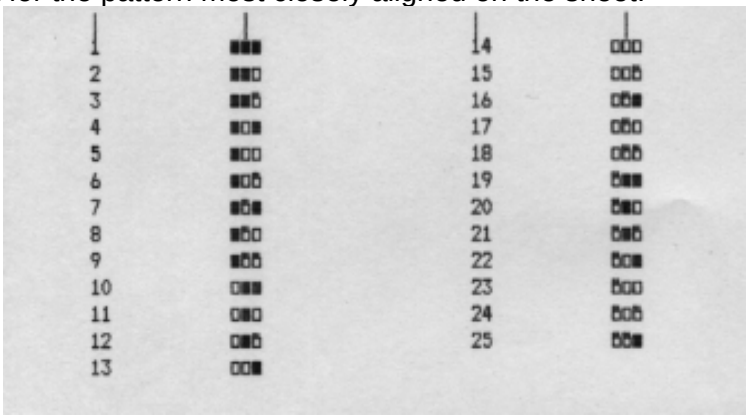


Figure 5-10. 25 Patterns

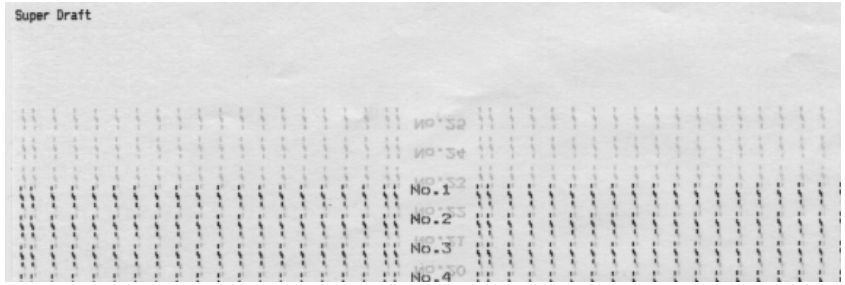


Figure 5-11. Supper Draft Pattern

4. Press the **LF / FF** or **Load / Eject** button until the **Pitch** lights match those for the best-aligned pattern on the guide sheet.
5. Press the **FONT** button to save your selection. The printer then prints 25 patterns in the Draft mode on the additional pages.
6. Return to step 3 of this procedure to adjust the Bi-d adjustment in the Draft mode and NLQ mode.
7. When you have performed the NLQ mode Bi-D adjustment, turn the printer off to finish the adjustment and save the value into the EEPROM on the main board.

5.2.3 Factory Settings

This section describes the procedure to reset factory settings, which is necessary if the main board is replaced. You can perform this procedure only with the setting diskette.

✓CHECK POINT

After you select factory setting in the Setting File menu, be sure to run the check program in the Main Menu. Running the check program writes the selected factory settings to the EEPROM and print several patterns.

1. Insert the Setting Diskette into Drive A of the PC and the power on.
2. Type **GWBASIC** and press **ENTER** to run the BASIC.
3. Load and run the adjustment program. First, the program displays Machine Select Menu.

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Printer select    ]
> (1)   9 pins
  (2) 24 pins
```

Figure 5-12. Machine Select Menu

4. Highlight **9 pins** by moving the cursor with ↑ or ↓ key and select it by pressing **ENTER**.
5. After select **9 pins**, the display shows the following menu;

```
Program : J******        Setting : ******
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Setting File    ]
> (1)  DEFSTD
  (2)  EURSTD
  (3)  NLSP
  (4)  ITALIC
  (5)  RUSSIAN
```

Figure 5-13. Setting File Menu

6. In the menu, highlight the factory settings for the printer's destination by moving the cursor with ↑ or ↓ key, and select the destination factory settings by pressing **ENTER** referring the Table 5-3.
7. After select the each factory setting, the display shows the main menu as following;

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Main MENU    ]
  (1)  Bi-d Adjust              (6) Envelope
 >(2)  FF paper                 (7) ---- N/A ----
  (3)  A3 Cut sheet             (8) -- SUB MENU
  (4)  A4 1P Cut sheet
  (5)  A4 6P Cut sheet
```

Figure 5-14. Main Menu

8. In this menu, select one of the check program, from 2 to 6, depending on the paper loaded, run the check program to print out check patterns. Running the check program write the selected factory settings to EEPROM.
9. To exit the program, press **ESC** until the display returns to the DOS prompt.

5.2.4 TPE Level Reset

This section describes the procedure to reset the TPE (top paper end) level. This operation is required when the PW sensor assembly is replaced, and if it is not performed, the printer does not recognize that the PW sensor has been replaced, thus, limiting the ability of the new sensor to operate. This operation can be performed only from the Setting Diskette.

✓CHECK POINT

After this operation, the reset value for the TPE LEVEL is printed out automatically. Check that the reset value is* FF*.

1. Insert the Setting Diskette into Drive A of the PC and the power on.
2. Type **GWBASIC** and press **ENTER** to run the BASIC.
3. Load and run the adjustment program. First, the program displays Machine Select Menu.

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Printer select    ]
> (1)   9 pins
  (2) 24 pins
```

Figure 5-15. Machine Select Menu

4. Highlight **9 pins** by moving the cursor with ↑ or ↓ key and select it by pressing **ENTER**.
5. After select **9 pins**, the display shows the following menu;

```
Program : J******        Setting : ******
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Setting File    ]
> (1)  DEFSTD
  (2)  EURSTD
  (3)  NLSP
  (4)  ITALIC
  (5)  RUSSIAN
```

Figure 5-16. Setting File Menu

6. In the menu, highlight the factory settings for the printer's destination by moving the cursor with ↑ or ↓ key, and select the destination factory settings by pressing **ENTER** referring the Table 5-3.
7. After select the each factory setting, the display shows the main menu as following;

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Main MENU    ]
  (1)  Bi-d Adjust              (6) Envelope
  (2)  FF paper                 (7) ---- N/A ----
  (3)  A3 Cut sheet           > (8) -- SUB MENU
  (4)  A4 1P Cut sheet
  (5)  A4 6P Cut sheet
```

Figure 5-17. Main Menu

8. In the menu, highlight SUB MENU by moving the cursor with ↑ or ↓ key, and select it by pressing **ENTER**.
9. After select the sub menu, the display shows the SUB MENU as following;

```
Program : J******        Setting : *****
 9 pins     VR 0  =  0       VR 1  =  0       VR 2 = 0

      [    Sub MENU    ]
  (1)  Memory SW Print      (6) EEPROM Print
  (2)  EEPROM Reset         (7) -- EXIT
 >(3)  TPE Adjust
  (4)  Pitch    1P
  (5)  Pitch   20P
```

Figure 5-18. Sub Menu

10. In the menu, highlight **TPE Adjust** by moving the cursor with ↑ or ↓ key, and select it by pressing **ENTER**.
11. Set an A4 size sheet in the portrait direction from the rear paper guide on the printer. Then the TPE check pattern and the current TPE position value is printed on it as shown below;
12. Measure the top of form position (TOF) at "0" level line as following figure, and check it within 8.5 ± 0.5 mm or not.

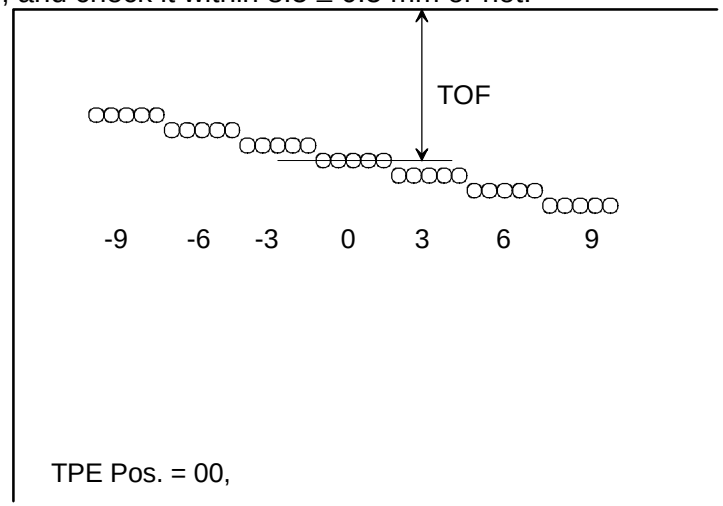


Figure 5-19. TOF Measurement

After printer prints out the pattern, the display shows as following;

< TPE adjustment >
TPE Pos. = 0

Exit	Print	Value	Write	Default
[ESC]	[SPACE]	[↑↓(0-9)]	[RET]	[HOME]

Figure 5-20. TPE Adjust Menu

13. In the menu, change the value by moving the cursor with ↑ or ↓ key If TOF is not within the specification, and transmit it to the printer by pressing **ENTER**.
14. To exit the program, press **ESC** until the display returns to the DOS prompt.

✓CHECK POINT

The adjusted value is not stored in the EEPROM until the printer power off, so you must once power off and on the printer after adjustment.

CHAPTER

6

MAINTENANCE

6.1 PREVENTIVE MAINTENANCE

Preventive maintenance includes regular cleaning of the exterior case using denatured alcohol, as well as occasional vacuuming of the mechanism interior to remove dust and paper debris. After cleaning the unit, check that it is adequately lubricated, as described in Section 6.2, below. Before returning the printer to the customer, inspect springs, paper-feed rollers and basic operation.

⚠WARNING ***Disconnect the printer from the external AC power source before maintenance.***

⚠CAUTION ***Do not use thinner, trichloroethylene, or ketone-based solvents on the plastic components of the printer.***

6.2 APPLYING LUBRICATION

EPSON recommends the printer be lubricated at the points illustrated in Figure 6-1. Table 6-1 lists each point along with its recommended lubricants are EPSON G-26 and O-2, which have been tested extensively and found to comply with the needs of this printer. (Table 6-1 provides details about these lubrications.) Before applying a lubricant, be sure the surface to be lubricated is clean. Do not apply too much, as this may damage nearly parts.

Table 6-1. Lubricants

Type	Name	Quantity	Availability	Part No.
Grease	G-26	40g	EPSON	B702600001
Oil	O-2	40cc	EPSON	B710200001

Table 6-2. Lubrication Points

Ref. No.	Lubrication Points	Quantity	Lubricant
1	Cam surface on spur gear (34.5mm)	2mm width, halfway	G-26
2	The platen gap adjustment slots on the right frame.	2mm width, from the top slot to the 3rd from the bottom	G-26
3	The shaft end of drive roller assembly and the cutout section on the left frame.	About ½ the size of a grain of rice	G-26
4	Oil pad	half of the pad	O-2
5	RD planetary shaft and planetary lever leaf spring	About ½ the size of a grain of rice	G-26
6	RD housing • Side of shafts : 3 points • Inside hole : 1 point	About ½ the size of a grain of rice	G-26
7	RD assembly • Gear teeth : 5 points	About ½ the size of a grain of rice	G-26
8	The side of shaft in RD Ratchet	About the size of a grain of rice	G-26
9	10 contact points of Paper Guide and Release Shaft	About the size of a grain of rice	G-26

Note : Lubrication must be applied during the re-assembly process.
For lubrication points, refer to the following figures;

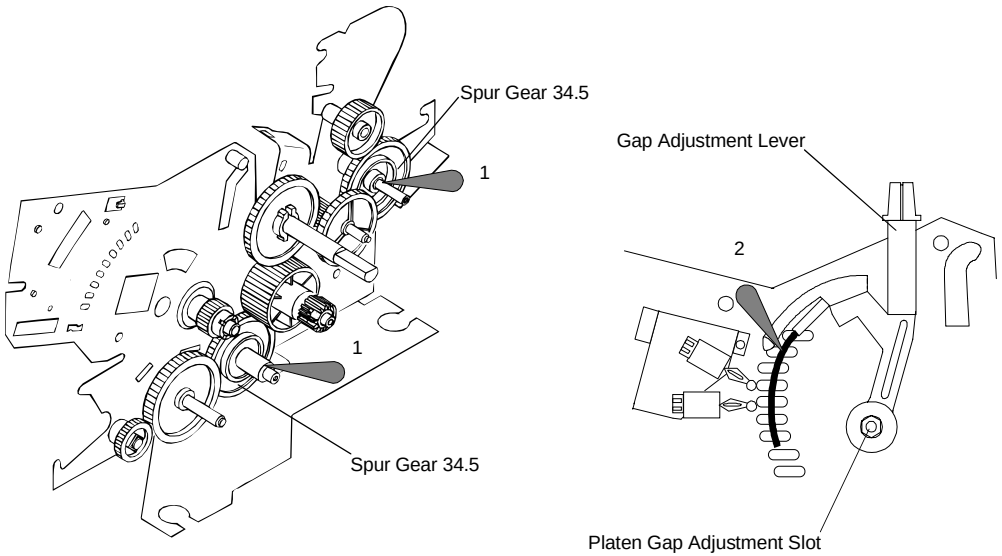


Figure 6-1. Lubrication points - 1

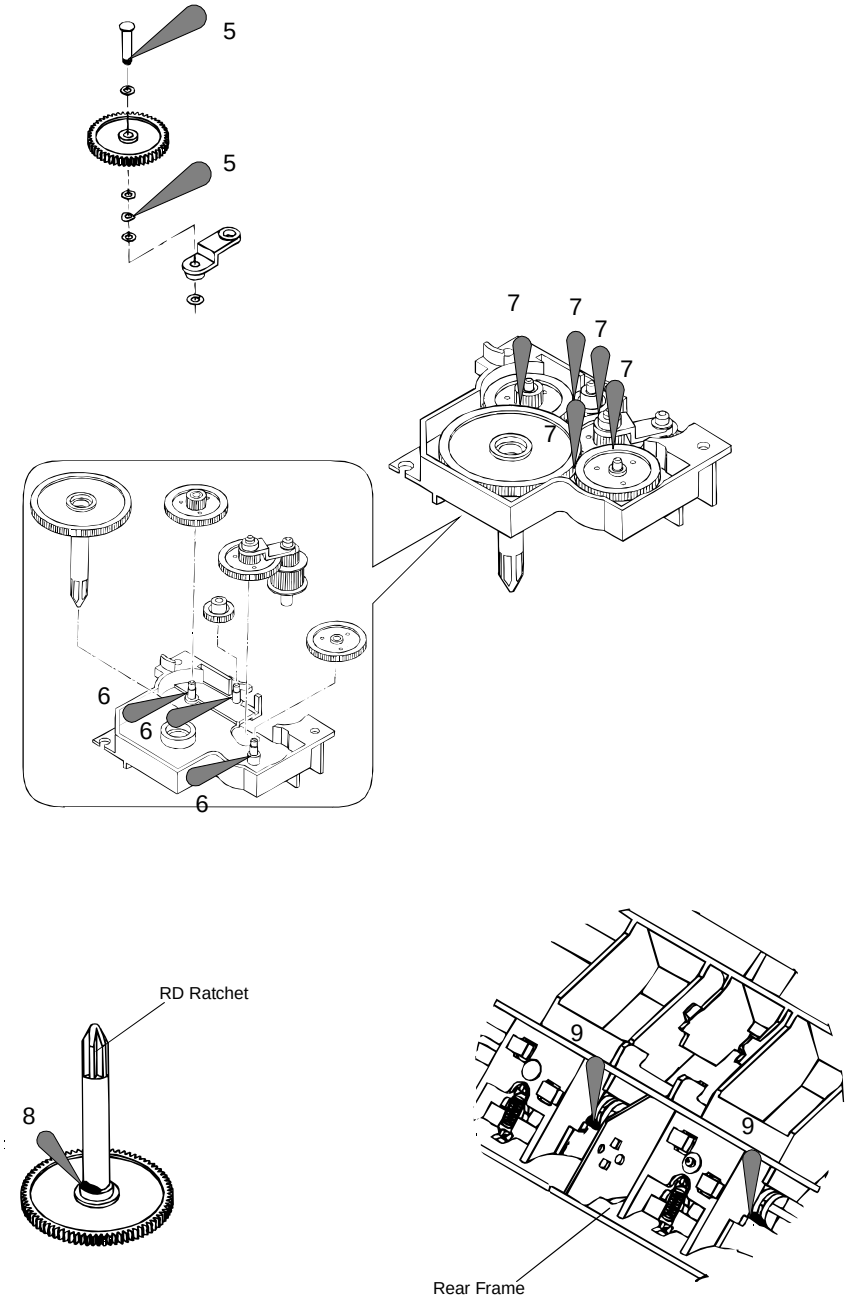


Figure 6-2. Lubrication points - 2

CHAPTER

7

APPENDIX

7.1 CONNECTOR SUMMARY

The following figure shows the connector connections of main components. And, the following table shows the summary of function s and sizes of the connectors.

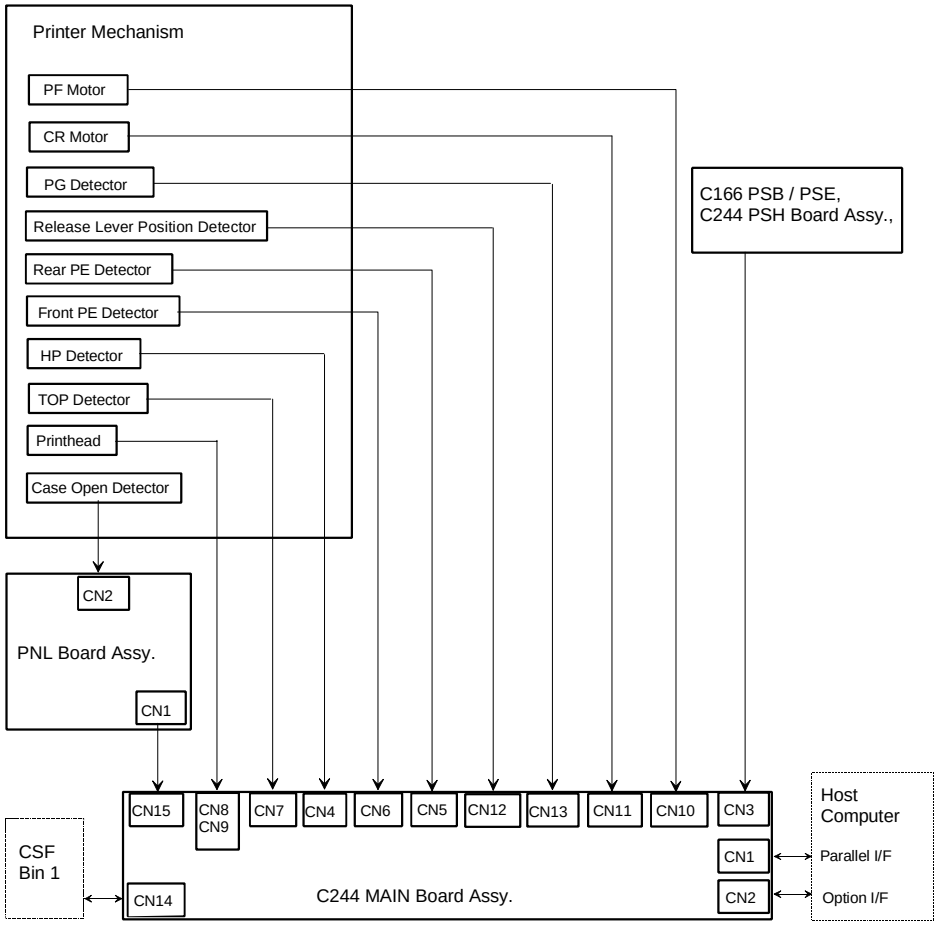


Figure 7-1. Main Components Connections

Table 7-1. Connector Summary

Board	Connector	Function	Pins
Main Board Assy.	CN1	Parallel Interface	36
	CN2	TYPE-B Interface	36
	CN3	Power Supply Board	10
	CN4	HP Sensor	3
	CN5	Rear PE Sensor	3
	CN6	Front PE Sensor	2
	CN7	TOP Sensor	4
	CN8	Printhead	18
	CN9	Printhead	16
	CN10	PF Motor	4
	CN11	CR Motor	5
	CN12	Release Lever Position Sensor	4
	CN13	PG Sensor	4
	CN14	CSF Bin 1	10
	CN15	PNL Board	22

Table 7-2. Connector Pin Alignments - CN3

Pin	I/O	Signal Name	Function
1	—	GP	—
2	—	GP	—
3	I	+35V	+35VDC
4	I	+35V	+35VDC
5	—	GND	Signal Ground
6	—	GND	Signal Ground
7	I	+5V	+5VDC
8	I	+5V	+5VDC
9	I	PWDN	Power Down detection signal
10	O	PSC	Power switch on/off signal

Table 7-3. Connector Pin Alignments - CN4

Pin	I/O	Signal Name	Function
1	I	HP	CR Home position signal
2	—	GND	Signal Ground
3	—	+5V	+5VDC

Table 7-4. Connector Pin Alignments - CN5

Pin	I/O	Signal Name	Function
1	—	+5V	+5VDC
2	I	PE	Rear paper end signal
3	—	GND	Signal Ground

Table 7-5. Connector Pin Alignments - CN6

Pin	I/O	Signal Name	Function
1	—	PE	Front paper end signal
2	I	GND	Signal Ground

Table 7-6. Connector Pin Alignments - CN7

Pin	I/O	Signal Name	Function
1	I	E	TOP sensor signal
2	—	GND	Signal Ground
3	—	+5V	+5VDC
4	—	A	+5VDC

Table 7-7. Connector Pin Alignments - CN8

Pin	I/O	Signal Name	Function
1	—	NC	Not connected
2	O	HD1	Head data 1
3	O	HD9	Head data 9
4	O	HD13	Head data 13
5	O	HD7	Head data 7
6	—	+35V	+35VDC
7	—	NC	Not connected
8	O	HD18	Head data 18
9	—	+35V	+35VDC
10	O	HD12	Head data 12
11	—	+35V	+35VDC
12	—	+35V	+35VDC
13	—	NC	Not connected
14	O	HD6	Head data 6
15	O	HD10	Head data 10
16	I	HTMP	Head temperature signal
17	—	+5V	+5VDC
18	—	NC	Not connected

Table 7-8. Connector Pin Alignments - CN9

Pin	I/O	Signal Name	Function
1	O	HD3	Head data 3
2	—	NC	Not connected
3	O	HD15	Head data 15
4	—	+35V	+35VDC
5	O	HD2	Head data 2
6	—	+35V	+35VDC
7	O	HD5	Head data 5
8	O	HD16	Head data 16
9	O	HD11	Head data 11
10	—	+35V	+35VDC
11	O	HD17	Head data 17
12	—	+35V	+35VDC
13	—	NC	Not connected
14	O	HD 14	Head data 14
15	O	HD4	Head data 4
16	O	HD8	Head data 8

Table 7-9. Connector Pin Alignments - CN10

Pin	I/O	Signal Name	Function
1	O	PF A	PF motor phase A signal
2	O	PF B	PF motor phase B signal
3	O	PF-A	PF motor phase /A signal
4	O	PF-B	PF motor phase /B signal

Table 7-10. Connector Pin Alignments - CN11

Pin	I/O	Signal Name	Function
1	O	PF A	CR motor phase A signal
2	O	PF-A	CR motor phase /A signal
3	O	PF B	CR motor phase B signal
4	O	PF-B	CR motor phase /B signal
5	—	CR COM	CR motor common

Table 7-11. Connector Pin Alignments - CN12

Pin	I/O	Signal Name	Function
1	I	RELEASE1	Release sensor 1 signal
2	—	GND	Signal Ground
3	I	RELEASE2	Release sensor 2 signal
4	—	GND	Signal Ground

Table 7-12. Connector Pin Alignments - CN13

Pin	I/O	Signal Name	Function
1	I	PG1	Platen gap sensor 1 signal
2	—	GND	Signal Ground
3	I	PG2	Platen gap sensor 2 signal
4	—	GND	Signal Ground

Table 7-13. Connector Pin Alignments - CN14

Pin	I/O	Signal Name	Function
1	O	A	CSF motor phase A signal
2	O	B	CSF motor phase B signal
3	O	-A	CSF motor phase /A signal
4	O	-B	CSF motor phase /B signal
5	O	HOLD	CSF motor hold signal
6	—	+5V	+5VDC
7	—	GND	Signal Ground
8	—	GND	Signal Ground
9	—	+35V	+35VDC
10	—	+35V	+35VDC

Table 7-14. Connector Pin Alignments - CN15

Pin	I/O	Signal Name	Function
1	I	COPEN	Case open sensor signal
2	O	PAUSE	Pause LED signal
3	—	+5V	+5VDC
4	O	POUTL	Paper out LED signal
5	O	RESRVL	Pitch select LED signal
6	I	PAUSSW	Pause button signal
7	O	TMIN2L	Tear off / bin select signal
8	O	TMIN1L	Tear off / bin select signal
9	O	PITC1L	Pitch select LED
10	O	PITC2L	Pitch select LED
11	—	FONT3L	Not connected
12	O	FONT2L	FONT LED signal
13	O	FONT1L	FONT LED signal
14	—	GND	Signal ground
15	—	GND	Signal ground
16	I	FONTSW	Font button signal
17	I	PITCSW	Pitch button signal
18	I	TBINSW	Tear off / bin signal
19	I	PSC	Operate button signal
20	I	LDEJSW	Load / Eject button signal
21	I	LFFFSW	LF / FF button signal
22	—	FG	Frame ground

7.2 CIRCUIT BOARD COMPONENT LAYOUT

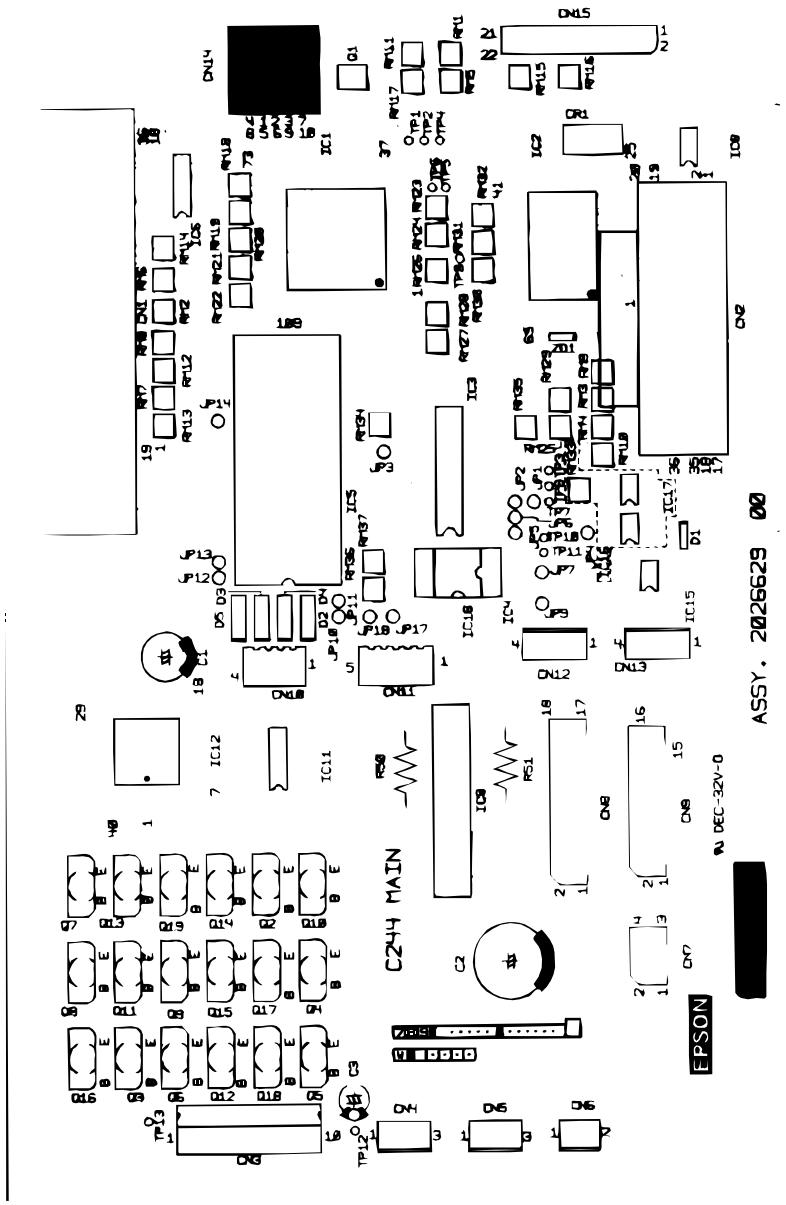


Figure 7-2. C244 MAIN Board Assembly Component Layout (1)

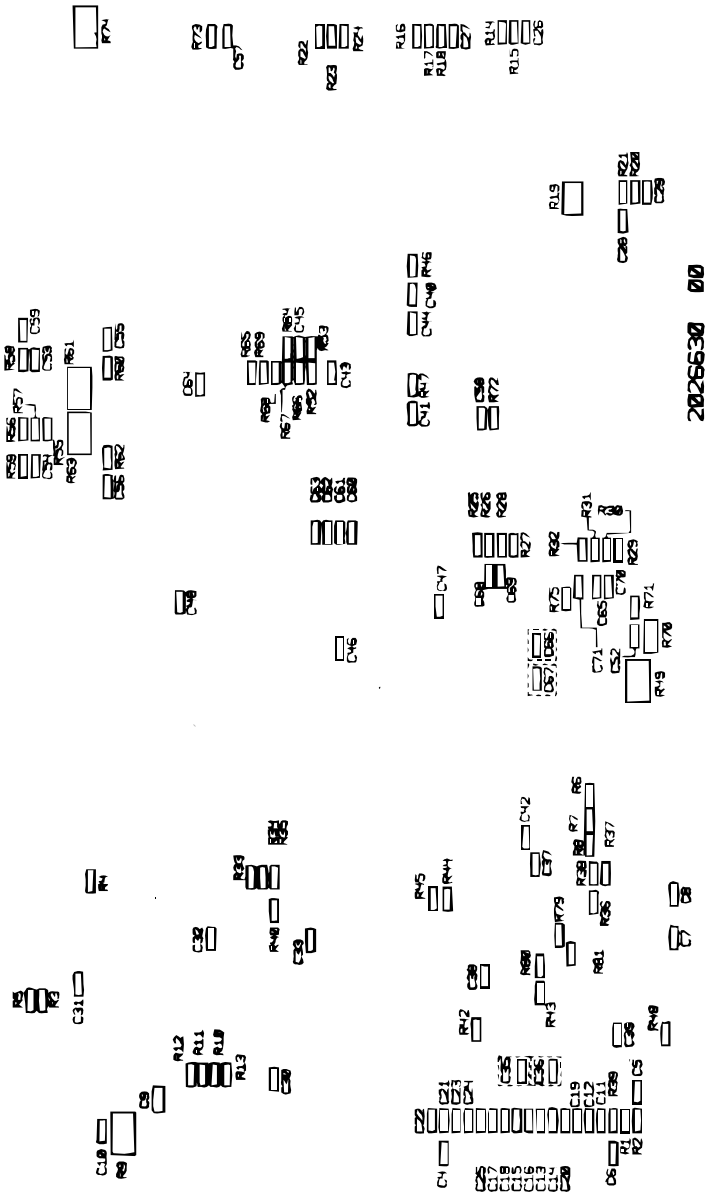


Figure 7-3. . C244 MAIN Board Assembly Component Layout (2)

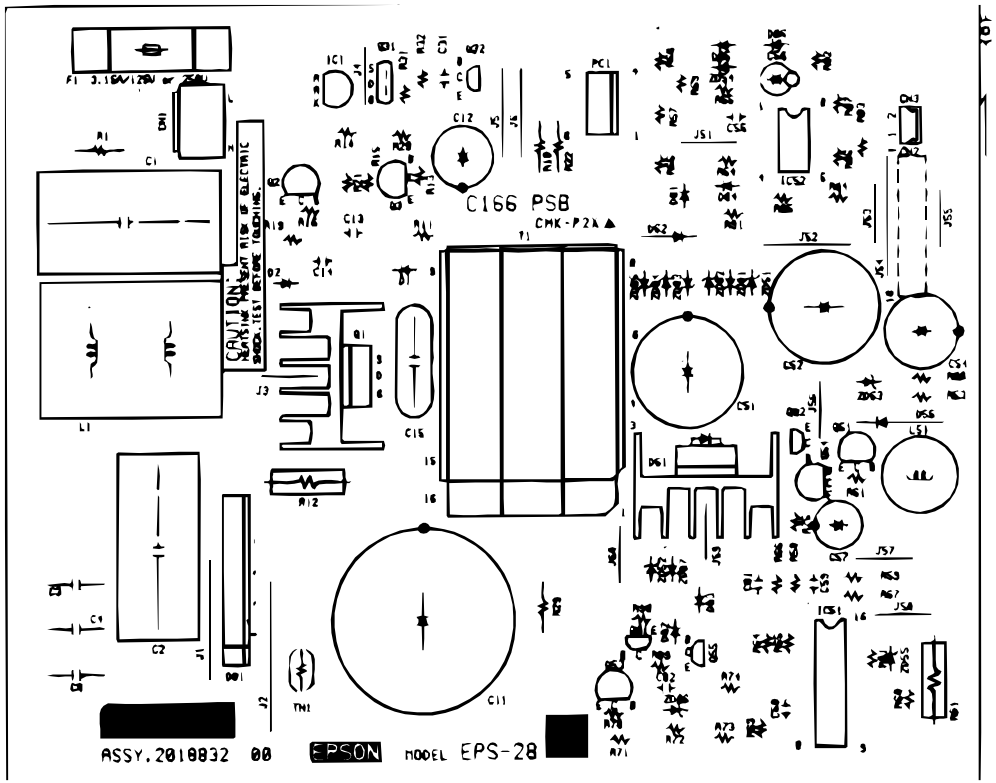


Figure 7-4. C166 PSB Board Assembly Component Layout

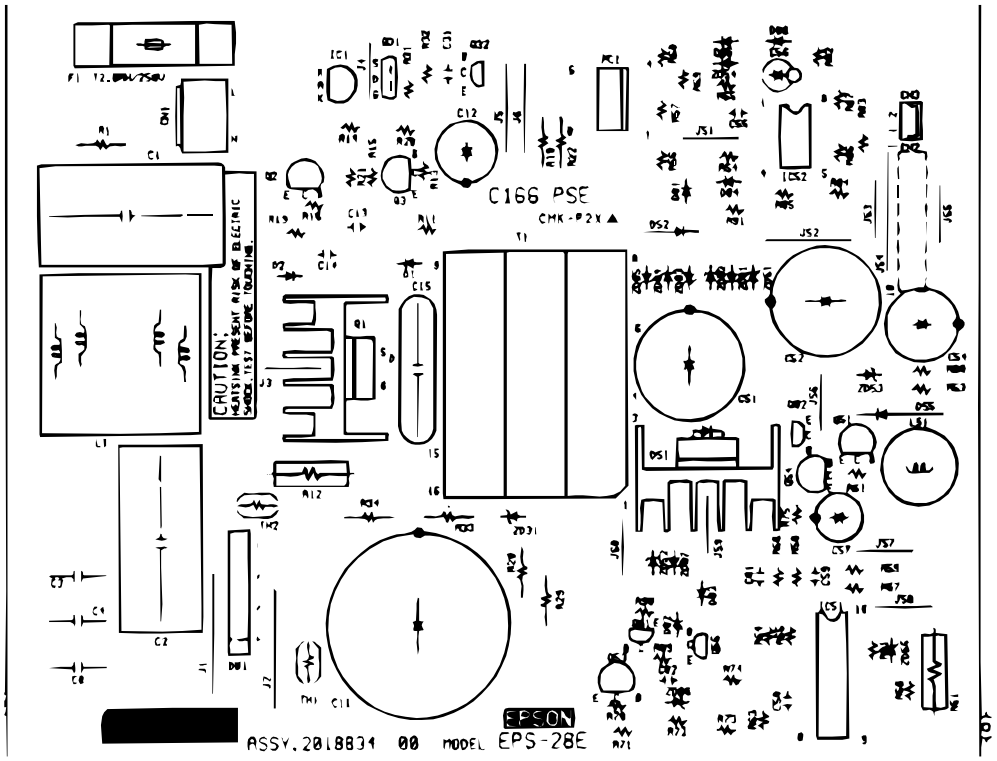
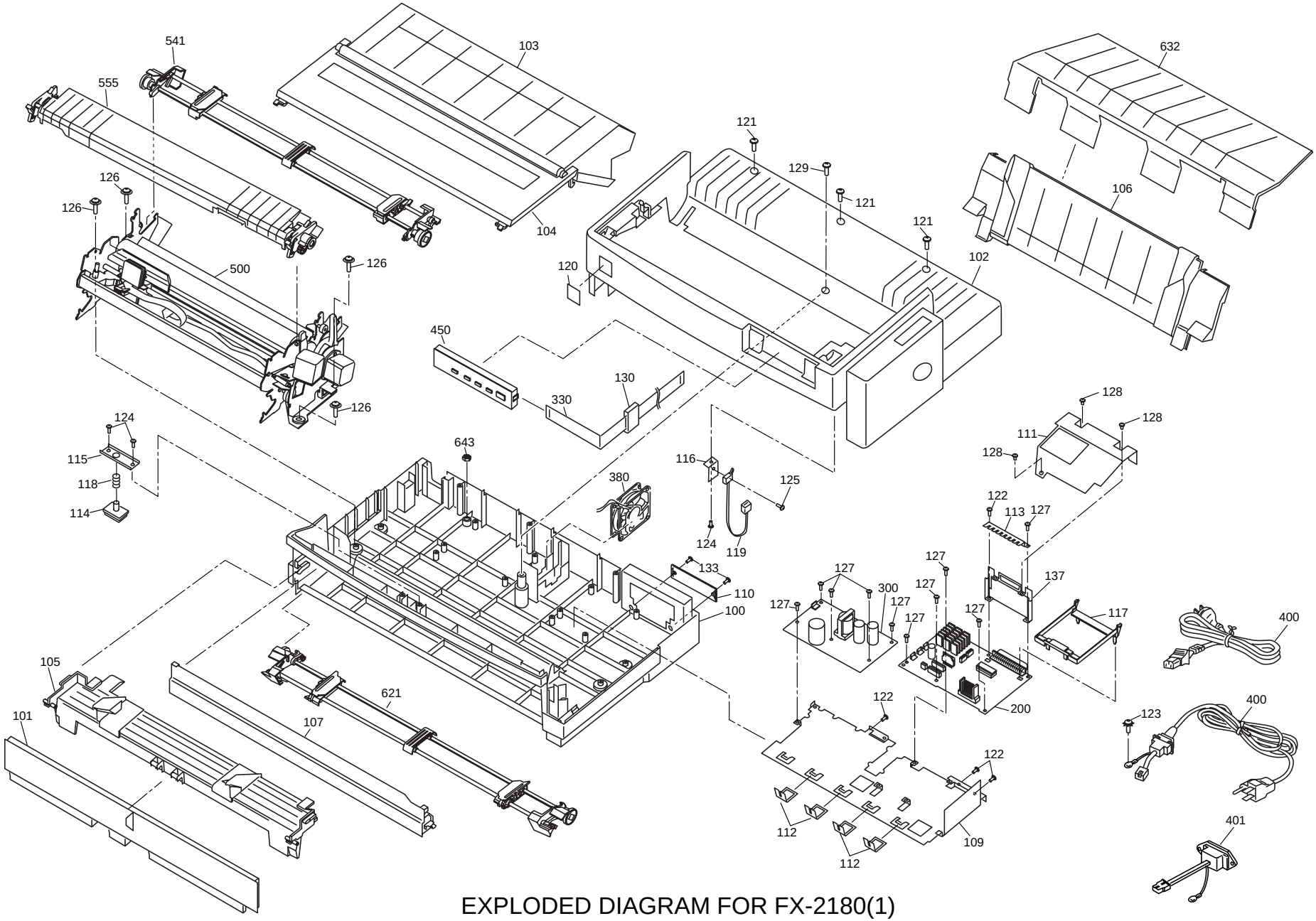


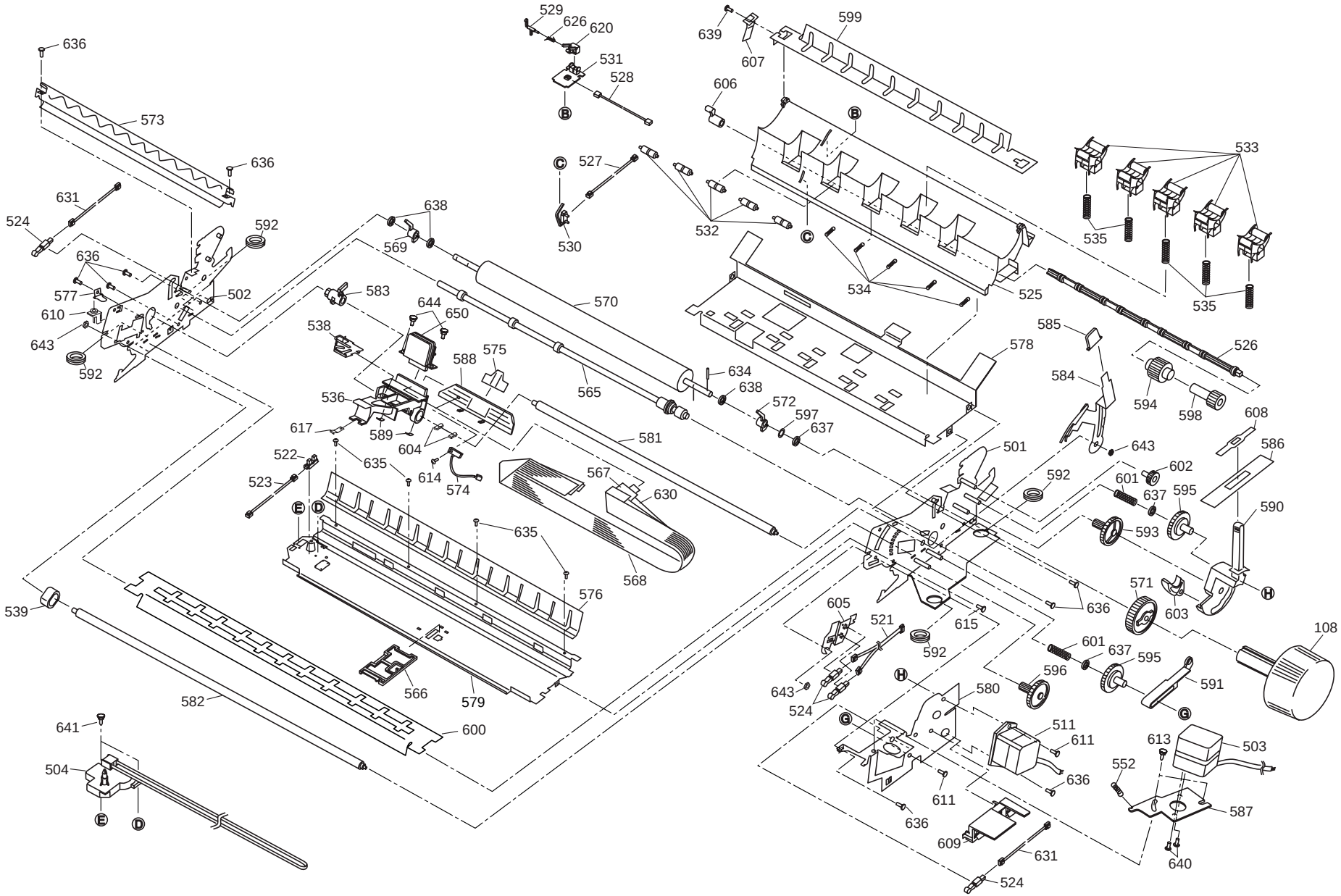
Figure 7-5. C166 PSE Board Assembly Component Layout

7.3 EXPLODED DIAGRAMS

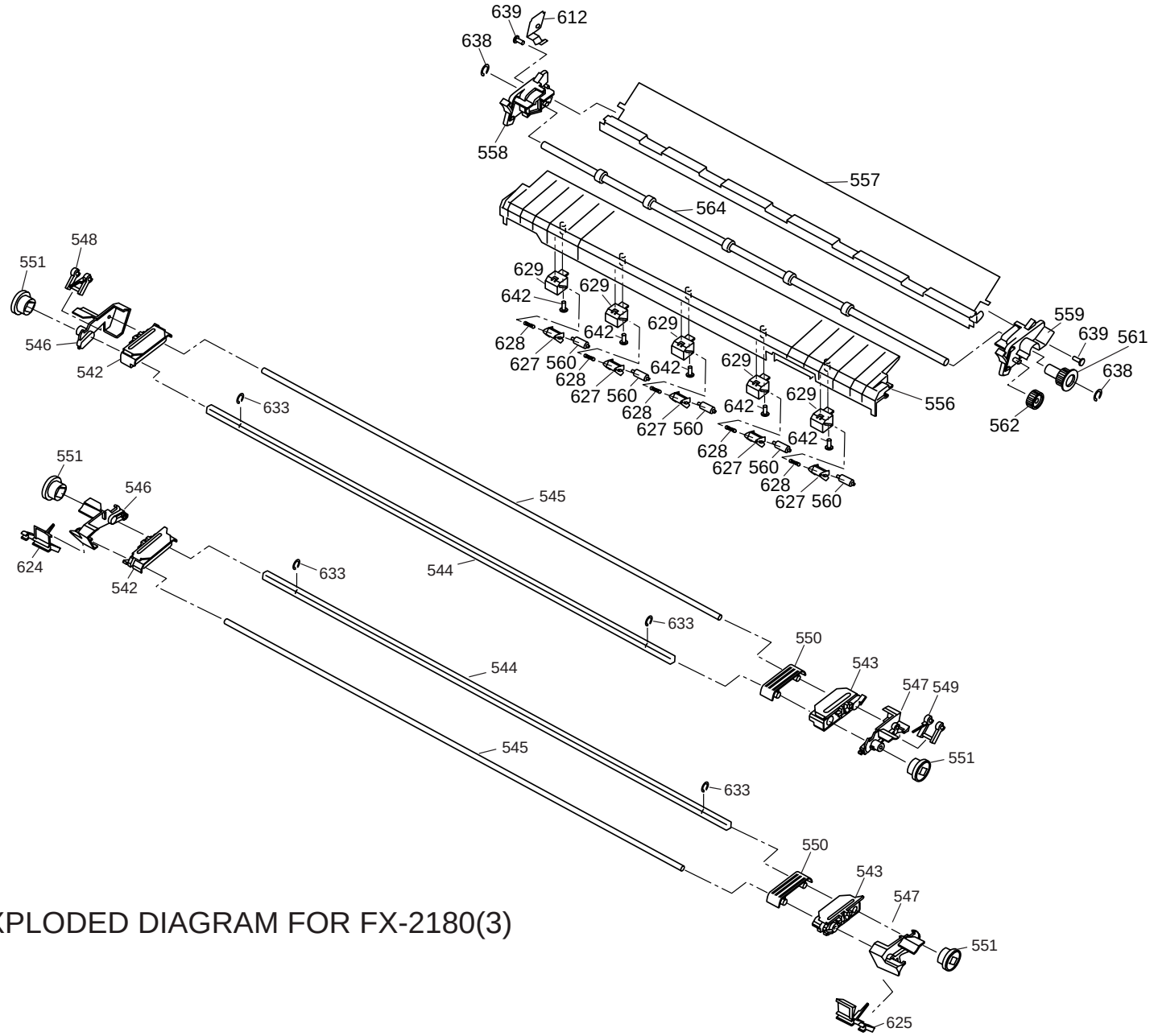
See the following 3 pages for the exploded diagrams for FX-2180.



EXPLODED DIAGRAM FOR FX-2180(1)



EXPLODED DIAGRAM FOR FX-2180(2)

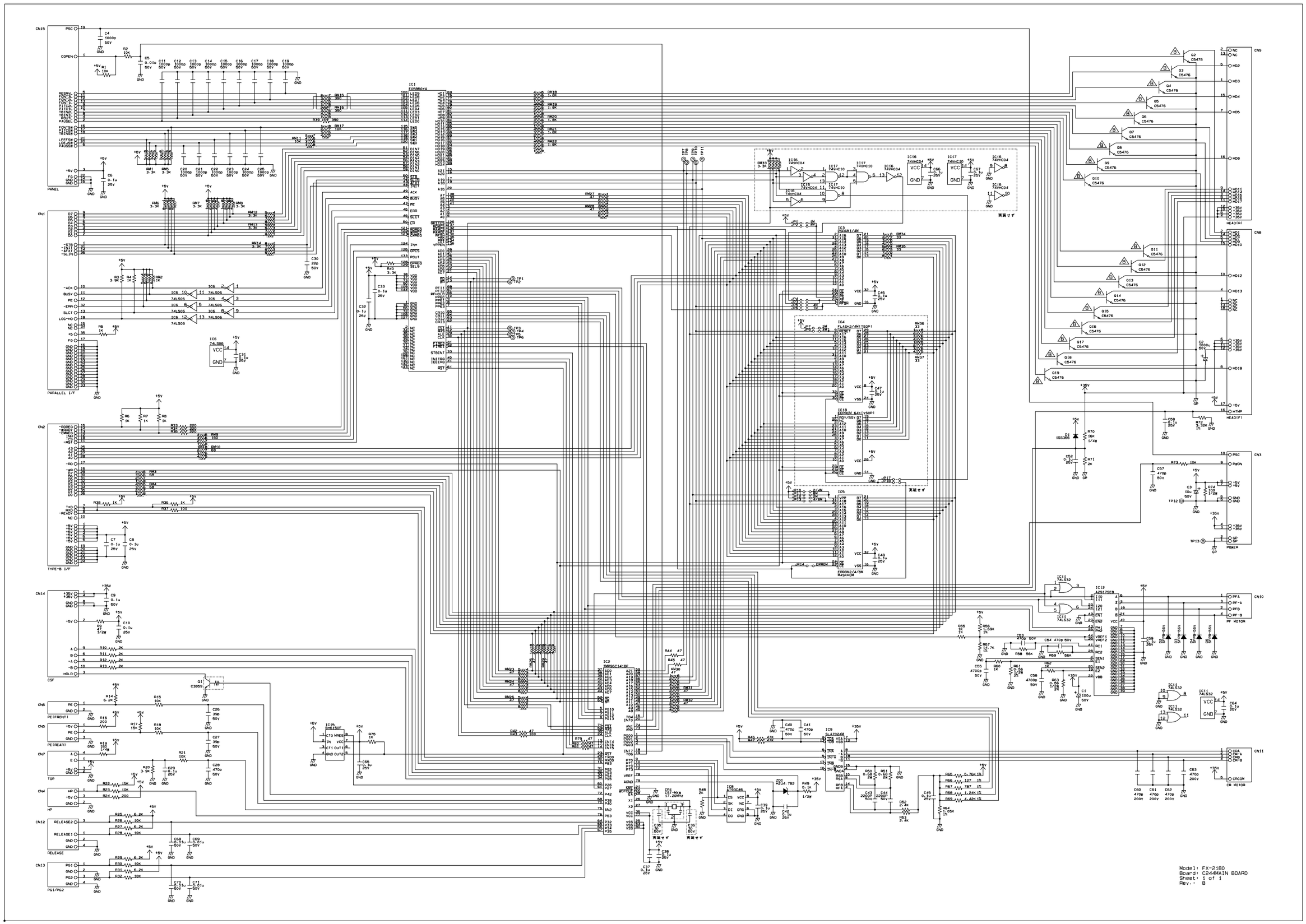


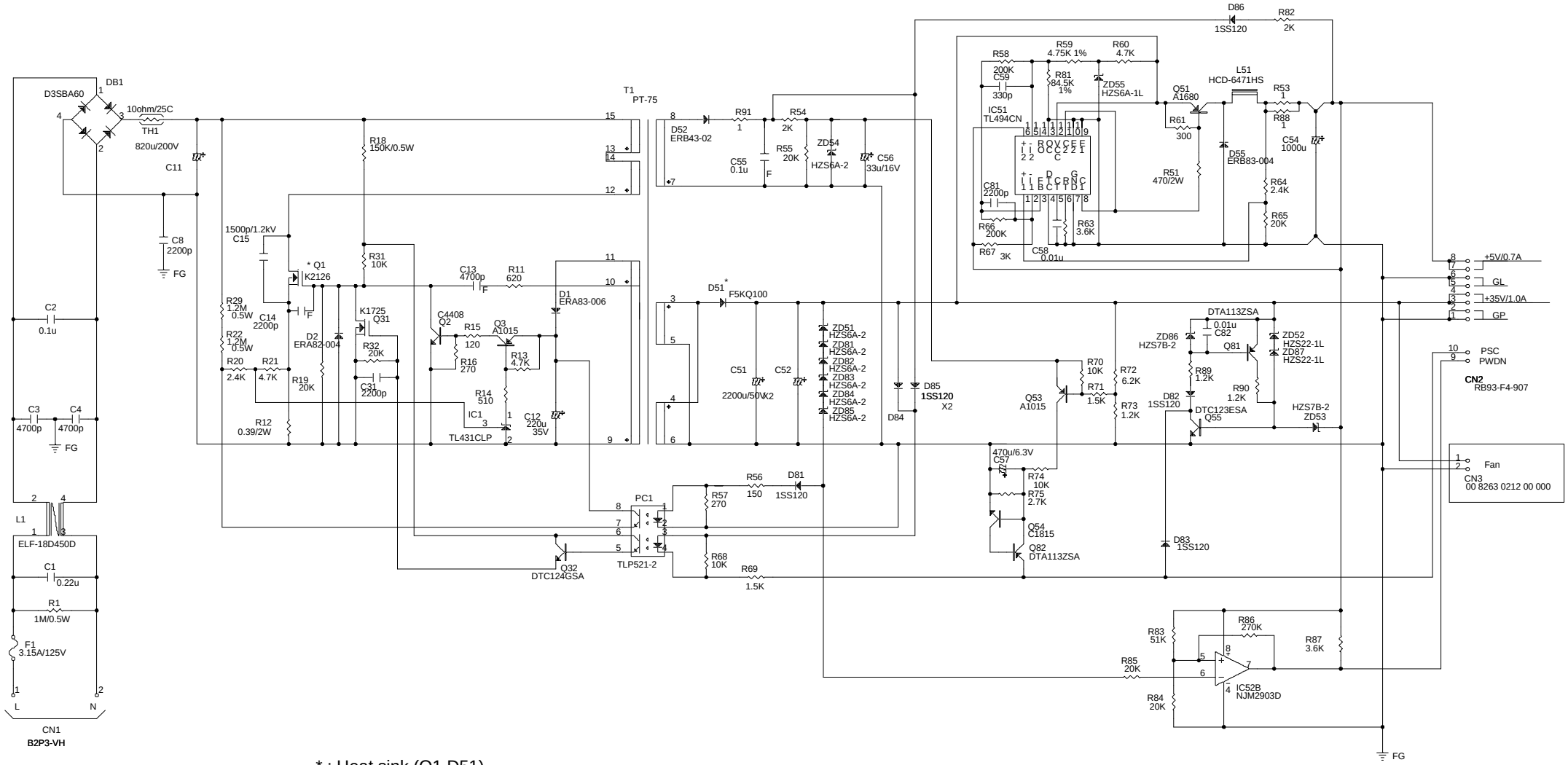
EXPLODED DIAGRAM FOR FX-2180(3)

7.4 CIRCUIT BOARD DIAGRAMS

See the following pages for the circuit diagrams below:

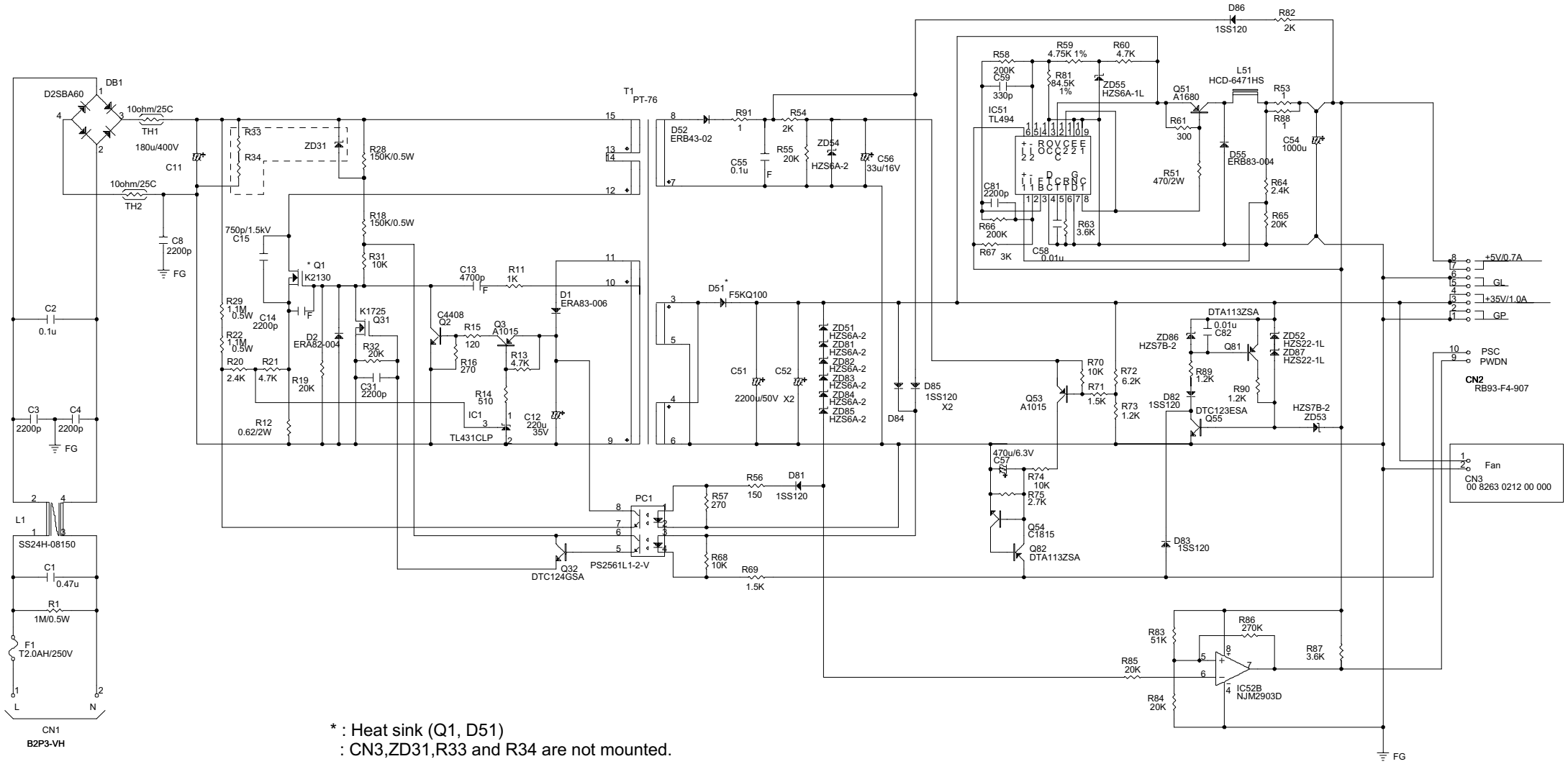
- C244 MAIN
- C166 PSB
- C166 PSE
- C244 PSH


PANEL
PARALLEL I/F
TYPE-B I/F
PE(FRONT)
PE(REAR)
TOP
HP
RELEASE
PG1/PG2
CSF
PF MOTOR
CR MOTOR
POWER
HEAD(R)
HEAD(F)
Model: FX-2180
Board: C24MAIN BOARD
Sheet: 1 of 1
Rev.: B



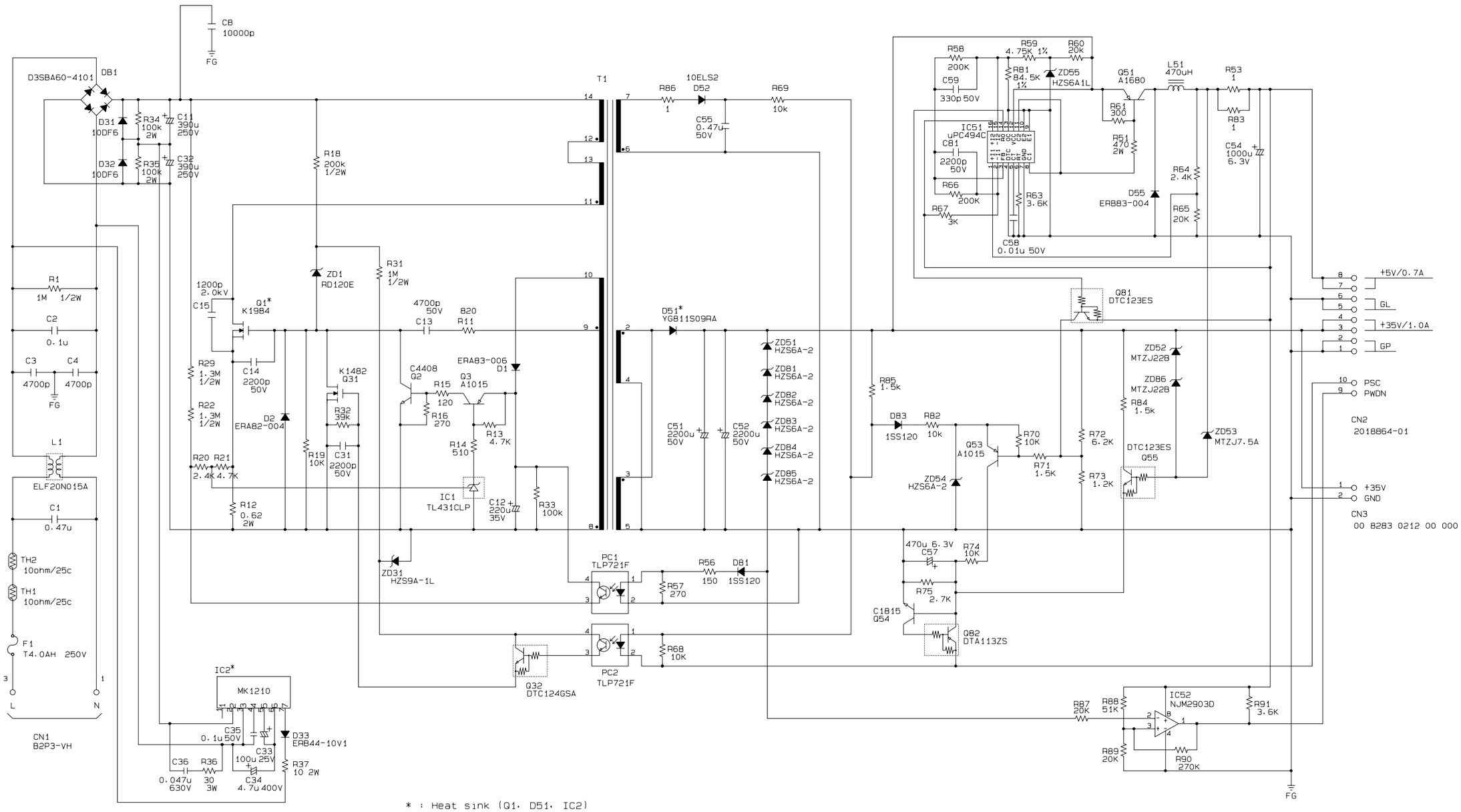
* : Heat sink (Q1,D51)
: CN3 is not mounted.

Model : FX-2180
Board : C166PSB BOARD
Sheet : 1 of 1
Rev. : B



* : Heat sink (Q1, D51)
: CN3,ZD31,R33 and R34 are not mounted.

Model : FX-2180
Board : C166PSE BOARD
Sheet : 1 of 1
Rev. : B


C8 10000p
FG
DB1
D3SBA60-4101
D31 10DF6
D32 10DF6
R34 100k 2W
R35 100k 2W
C11 390u 250V
C32 390u 250V
R18 200k 1/2W
T1
R86 1
10ELS2 D52
C55 0.47u 50V
R69 10k
R58 200K
C59 330p 50V
R59 4.75K 1%
R60 20K
R81 84.5K 1%
ZD55 HZS6A1L
Q51 A1680
L51 470uH
R53 1
R83 1
IC51 uPC494C
C81 2200p 50V
R66 200K
R67 3K
R63 3.6K
C58 0.01u 50V
R61 300
R51 470 2W
R64 2.4K
D55 ERB83-004
R65 20K
C54 1000u 6.3V
Q81 DTC123ES
R1 1M 1/2W
C2 0.1u
C3 4700p
C4 4700p
FG
L1
ELF20N015A
C1 0.47u
TH2 10ohm/25c
TH1 10ohm/25c
F1 T4.0AH 250V
CN1 B2P3-VH
1200p 2.0kV
C15
Q1* K1984
ZD1 RD120E
R31 1M 1/2W
4700p 50V
C13
820
R11
D51* YG811S09RA
R29 1.3M 1/2W
R22 1.3M 1/2W
C14 2200p 50V
D2 ERA82-004
K1482 Q31
R32 39k
C31 2200p 50V
R19 10K
R20 2.4K
R21 4.7K
R12 0.62 2W
C4408 Q2
R15 120
R16 270
Q3 A1015
ERA83-006 D1
R13 4.7K
R14 510
IC1 TL431CLP
C12 220u 35V
R33 100k
ZD31 HZS9A-1L
PC1 TLP721F
R56 150
D81 1SS120
R57 270
PC2 TLP721F
Q32 DTC124GSA
R68 10K
IC2* MK1210
C35 0.1u 50V
C33 100u 25V
D33 ERB44-10V1
C36 0.047u 630V
R36 30 3W
C34 4.7u 400V
R37 10 2W
C51 2200u 50V
C52 2200u 50V
ZD51 HZS6A-2
ZD81 HZS6A-2
ZD82 HZS6A-2
ZD83 HZS6A-2
ZD84 HZS6A-2
ZD85 HZS6A-2
R85 1.5k
D83 1SS120
R82 10k
Q53 A1015
R70 10K
R71 1.5K
ZD54 HZS6A-2
R72 6.2K
R73 1.2K
ZD52 MTZJ22B
ZD86 MTZJ22B
R84 1.5k
DTC123ES Q55
ZD53 MTZJ7.5A
470u 6.3V C57
R74 10K
R75 2.7K
C1815 Q54
Q82 DTA113ZS
IC52 NJM2903D
R87 20K
R88 51K
R89 20K
R90 270K
R91 3.6K
+5V/0.7A
GL
+35V/1.0A
GP
PSC
PWDN
CN2 2018864-01
+35V
GND
CN3 00 8283 0212 00 000
* : Heat sink (Q1, D51, IC2)
Model : FX-2180
Board : C244PSH BOARD
Sheet : 1 of 1
Rev. : 0